3.0 Affected Environment and Environmental Impacts

Information presented in this chapter describes the relevant resource components of the affected environment. Only resources that could be affected by the alternatives, or that could affect the alternatives if implemented, are described. Data and analyses presented in these sections correspond with the importance of the impact and with concerns raised during the scoping process. The following resource areas are presented in this chapter: land use and infrastructure, geology and soils, engineering and hazardous materials, electric and magnetic fields, water, wetlands, vegetation, wildlife, fish, threatened and endangered species, air quality, noise, socioeconomics, cultural resources, visuals, and the transmission grid. Section 3.17 summarizes the findings DEQ must make to certify the project under MFSA.

The location and extent of the affected environment for the alternatives depend on the resource under evaluation. For most resources, the affected environment analysis area for the transmission line is the 500-foot-wide alignment for each alternative. Where affected environment resource analysis areas extend beyond the construction area, the extended area is described at the beginning of the resource area section, and in many cases corresponds to MATL's study area (MATL 2006b) shown in **Figure 1.1-1**.

After the affected environment for each resource has been described, the impacts of the Project and alternatives are discussed, including the direct and indirect impacts, and short-term and long-term impacts. Short-term impacts are defined for this project as those that would take place during the construction phase. The construction phase is expected to last six months. Long-term impacts are defined for this project as those that would take place during the operation and maintenance of the line. The cumulative impacts for each resource are discussed in Chapter 4. Chapter 4 also includes a discussion of unavoidable adverse impacts and irreversible and irretrievable commitments of resources. The text includes detailed descriptions for impacts and resources relevant to identified issues of concern (Section 1.6).

3.1 Land Use and Infrastructure

This section describes the human use of the land for economic production, and for residential, recreational, or other purposes.

3.1.1 Analysis Methods

Quantitative analysis of the number of miles included in a transmission line alignment, and the associated number of acres and land use was based on Geographic Information System (GIS) analysis of the action alternatives. Assumptions needed for GIS analysis included:

- Existing land uses were developed from interpretation of orthophotographs (aerial photographs with distortion removed) taken in 2005 (Montana NRIS 2006a). Some land uses may have changed since the photographs were taken. **Appendix H** presents land use by milepost for each alternative.

- Existing ownership information was developed from county plats and other sources. Information is believed to be accurate and up to date. However, some recording errors may have occurred, or lands may have been sold since the GIS information was developed.

Analysis Area

The analysis area for land use and infrastructure is the study area defined in MATL's permit application (MATL 2006b). Detailed analysis was conducted along the 500-foot-wide transmission line proposed alignment and alternatives.

Information Sources

Data and information for this section were compiled and refined from several sources including, but not limited to, computer assisted mass appraisal (CAMA), GAP Analysis data, and photographic interpretation and other sources. MATL verified this information by ground reconnaissance during July and August 2005. In addition, MATL contacted federal, state, and local regulatory personnel by telephone and in person to validate existing information and to solicit additional information. This information was included in the MFSA application (MATL 2006b).

DEQ also verified land use information in the summer of 2006 by:

- conducting a general reconnaissance field trip of the alignments from Great Falls to the U.S.-Canada border,

- field verifying physical features and land uses along portions of the alternatives by driving along the alignments, recording observations, and taking periodic Global Positioning System (GPS) readings, and
- overlaying the alignments on 2005 orthophotographs (Montana NRIS 2006a) and documenting visible land uses by milepost (See **Appendix H**).

The land uses documented included: mechanically irrigated cropland, non-irrigated cropland, rangeland/native vegetation, forest, residential, existing rights of way, riparian habitat, and water. Information was generally mapped at a scale of 1:24,000.

Information describing the existing transportation and utility networks was obtained from the MFSA application (MATL 2006b) or from Mr. Jim McDonald, Teton County road foreman. Details regarding farm tractors and tillage equipment were obtained from an interview with Mr. Bruce Broesder, service warranty writer for Torgersons, Inc. in Great Falls, and timelines for planting and harvesting were obtained from Mr. Sherwin K. Smith, Executive Director of the Teton County Farm Services Agency in Choteau. Mileages were derived from GIS.

3.1.2 Affected Environment

The following land uses and ownership categories are described in this section:

- Cities, towns, unincorporated communities,
- Developed residential, industrial, and commercial areas adjoining cities and towns,
- Federal and state highways and county roads,
- Railroads and railroad rights of way,
- Existing electric transmission lines,
- Communication facilities,
- Military installations,
- Conservation easements,
- Public and private airports,
- National trails,
- Farmland differentiated by irrigated cropland, mechanically irrigated cropland, non-irrigated cropland, rangeland/native vegetation, and conservation reserve program,
- Mines, and
- Land ownership categories (federal, state, tribal, private).

Land Ownership

Figures 3.1-1, 3.1-2 and **3.1-3** show land ownership in the south, middle, and north parts of the analysis area. **Table 3.1-1** summarizes the proportion of land ownership and jurisdiction within the analysis area (Montana Natural Resource Information System [Montana NRIS] 2006a). The majority (89.7 percent) is privately owned, with the remainder owned or managed by state, federal, and local government agencies. A discussion of public land management, relative to facility siting, is provided below.

TABLE 3.1-1
LANDOWNERSHIP AND JURISDICTION WITHIN ANALYSIS AREA

Ownership	Percent of Analysis Area
Local Government	0.3
Private	89.7
Right of Way	0.6
State Government	6.7
Tribal	0.0
Undetermined	0.0
U.S. Department of Agriculture	0.0
U.S. Department of Defense	0.1
U.S. Government	0.0
U.S. Department of Agriculture Forest Service	0.0
U.S. Department of the Interior Bureau of Land Management	1.5
U.S. Department of the Interior Fish and Wildlife Service	0.5
Water	0.5
Total	100.0

Source: Montana NRIS 2006a

Land Use Categories

Land use categories described in this section are: residential, commercial and industrial, agricultural, publicly managed, and conservation easements.

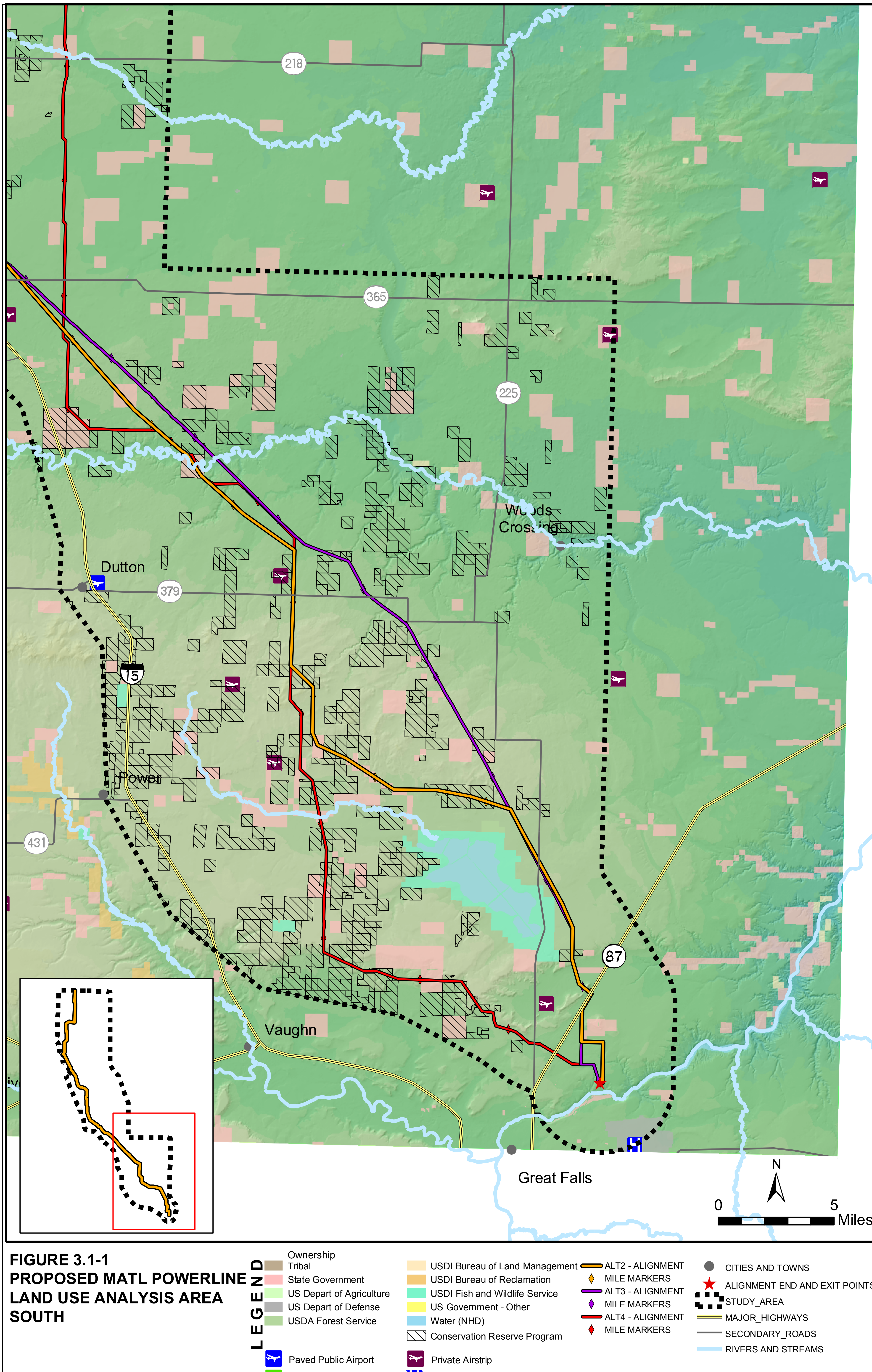


FIGURE 3.1-1
PROPOSED MATL POWERLINE LAND USE ANALYSIS AREA SOUTH

GIS map by Patricia Williams -TTMTI 3-1-1-LandUseAnalysisArea-South.mxd

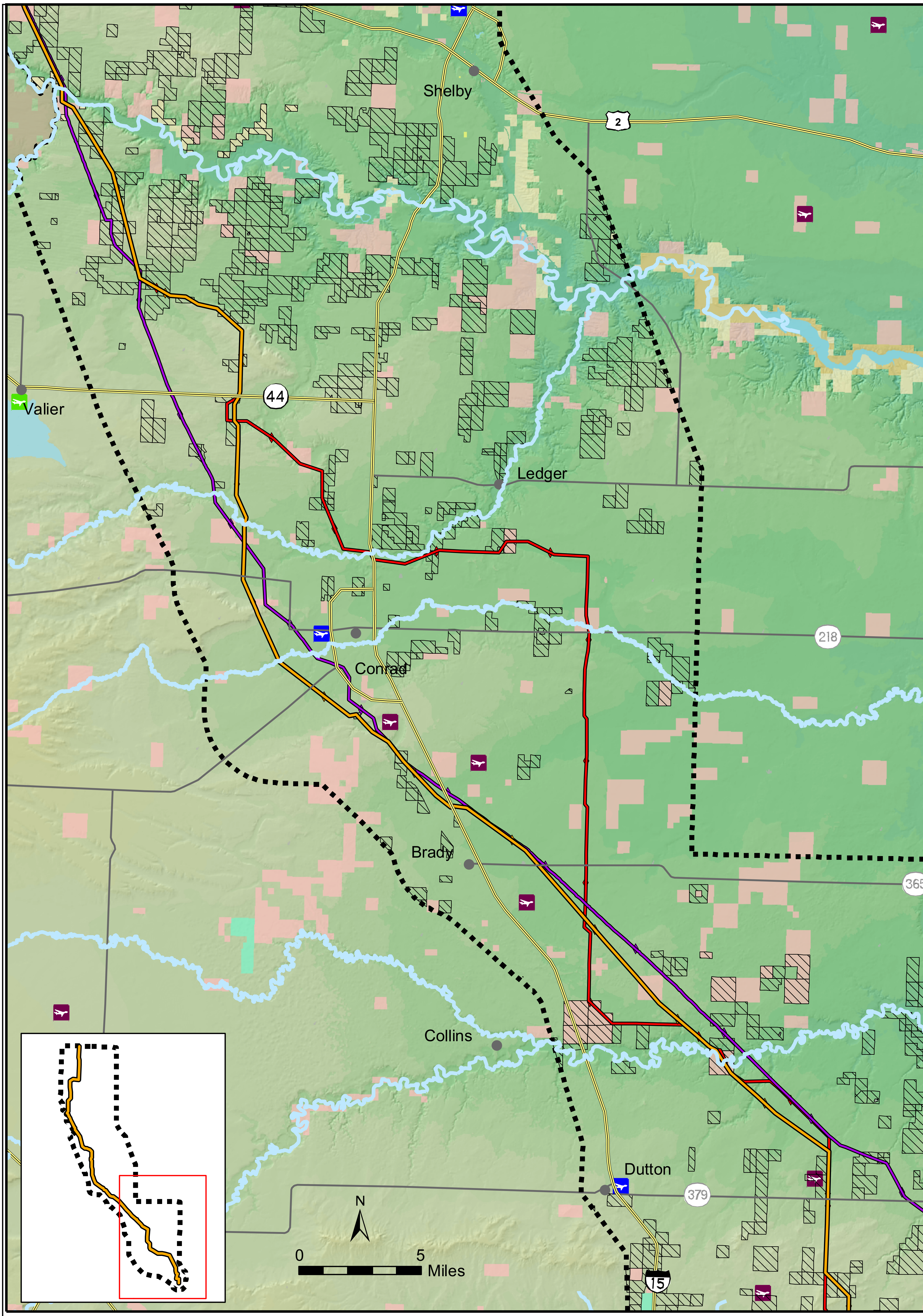


FIGURE 3.1-2
PROPOSED MATL POWERLINE
LAND USE ANALYSIS AREA
MIDDLE

LEGEND

Ownership
- Tribal
- State Government
- US Depart of Agriculture
- US Depart of Defense
- USDA Forest Service
- USDI Bureau of Land Management
- USDI Bureau of Reclamation
- USDI Fish and Wildlife Service
- US Government - Other
- Water (NHD)
- Conservation Reserve Program
- Paved Public Airport
- Unpaved Public Airport
- Private Airstrip
- Heliport
- ALT2 - ALIGNMENT
- MILE MARKERS
- ALT3 - ALIGNMENT
- MILE MARKERS
- ALT4 - ALIGNMENT
- MILE MARKERS
- CITIES AND TOWNS
- ALIGNMENT END AND EXIT POINTS
- STUDY_AREA
- MAJOR_HIGHWAYS
- SECONDARY_ROADS
- RIVERS AND STREAMS

GIS map by Patricia Williams -TTMTI 3-1-2-LandUseAnalysisArea-Middle.mxd

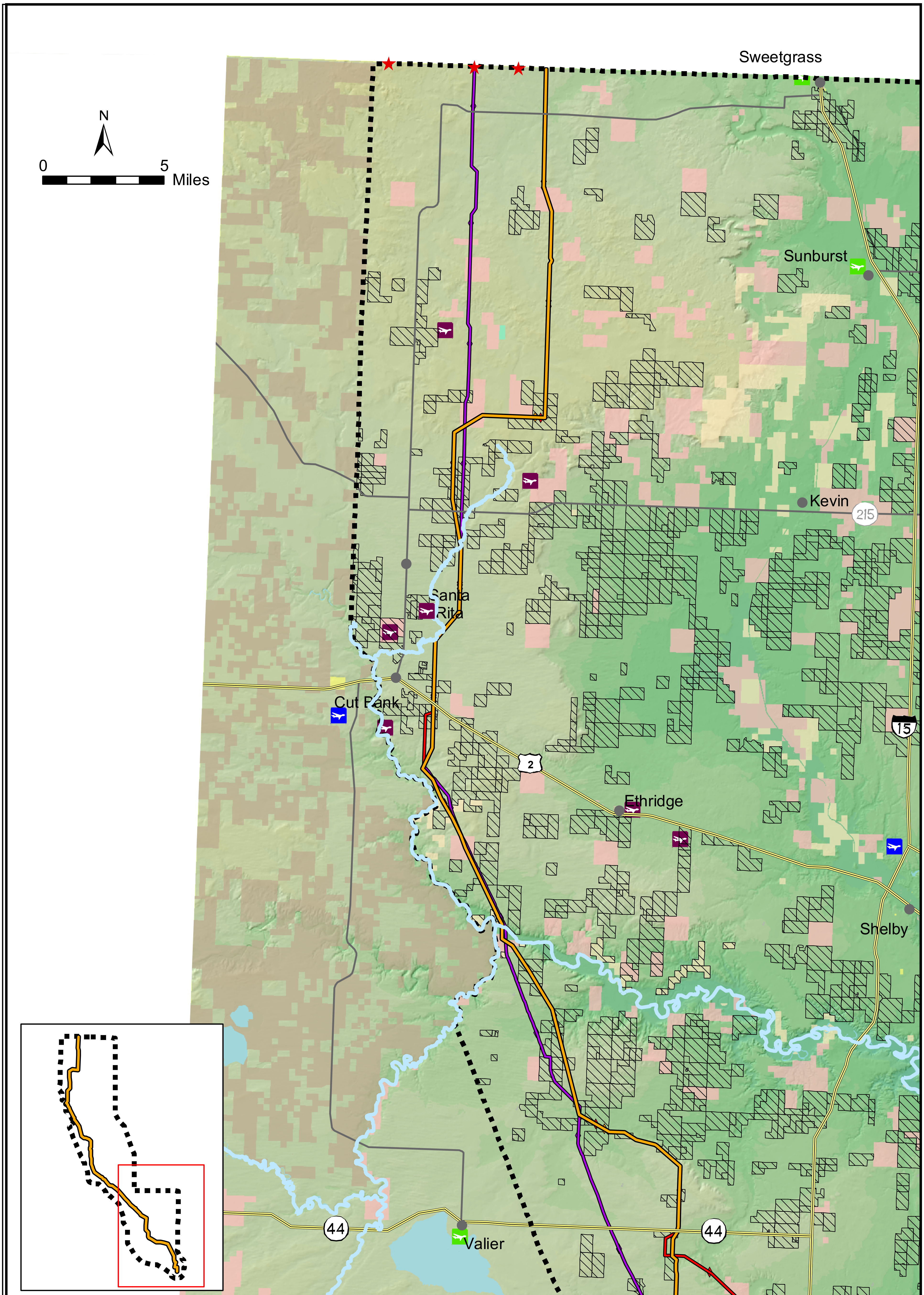


FIGURE 3.1-3
PROPOSED MATL POWERLINE
LAND USE ANALYSIS AREA
NORTH

LEGEND

Ownership
- Tribal
- State Government
- US Depart of Agriculture
- US Depart of Defense
- USDA Forest Service
- USDI Bureau of Land Management
- USDI Bureau of Reclamation
- USDI Fish and Wildlife Service
- US Government - Other
- Water (NHD)
- Conservation Reserve Program
- ALT2 - ALIGNMENT
- MILE MARKERS
- ALT3 - ALIGNMENT
- MILE MARKERS
- ALT4 - ALIGNMENT
- MILE MARKERS
- CITIES AND TOWNS
- ALIGNMENT END AND EXIT POINTS
- STUDY_AREA
- MAJOR_HIGHWAYS
- SECONDARY_ROADS
- RIVERS AND STREAMS
- Paved Public Airport
- Unpaved Public Airport
- Private Airstrip
- Heliport

GIS map by Patricia Williams -TTMTI 3-1-3-LandUseAnalysisArea-North.mxd

Residential

Residential land use in the analysis area includes cities, towns, colonies, residential clusters (for example, unincorporated subdivisions), and dwellings (for example, farm or ranch houses). In addition, several Hutterite colonies are located within the analysis area. Cities and towns within the analysis area are:

- Great Falls, in Cascade County,
- Power and Dutton, in Teton County,
- Conrad and Brady, in Pondera County,
- Shelby, Sunburst, and Sweetgrass, in Toole County, and
- Cut Bank, in Glacier County.

With the exception of Cascade County, no land use zoning rules currently apply in the analysis area and no planned subdivisions are currently proposed for future construction in analysis area portions of Glacier, Toole, or Pondera counties (Yeagley 2006). In the Cascade County portion of the analysis area, no planned subdivisions occur (MATL 2006b). In Teton and Chouteau counties, there is no zoning and there are no planned residential developments in the analysis area (MATL 2006b).

Commercial and Industrial

Commercial and industrial activities (linear/point facilities) within the analysis area include communication facilities (cellular telephone and microwave), oil and gas production, surface mining (gravel pits), airstrips (public and private), railroads, pipelines and transmission lines, roadways, and military installations (MATL 2006b). Primary concentrations of communication sites occur in the vicinity of Great Falls, Shelby, and Cut Bank, although individual facilities are distributed throughout the area. Existing commercial and industrial businesses within the study area were located based on parcel information in the CAMA database.

Oil and gas production facilities occur primarily in the northern half of the analysis area and consist of pump and compressor stations, collector and transmission pipelines, meter stations, industrial or processing plants, and product storage tanks, both above and below ground (MATL 2006b). Most oil and gas facilities are associated with production and processing of natural gas or propane, though approximately one-third are associated with crude oil (MATL 2006b).

Several public and private airports or airstrips occur within the analysis area. Public airports include those associated with the towns of Sunburst, Shelby, Conrad, and Dutton (MATL 2006b).

Agricultural

Of the 1,444,790 acres in the analysis area, approximately 1,277,000 acres (88 percent of the analysis area) are considered agricultural lands, including irrigated and non-irrigated cropland and rangeland. **Table 3.1-2** summarizes the proportion of different agricultural land uses in the analysis area. Agricultural lands are almost entirely on privately owned land; however, some dry land crops and grazing occur on public lands within the analysis area.

Irrigated croplands include those croplands irrigated using flood, pivot, and wheel and hand line irrigation systems. Crops grown on irrigated fields in the region are typically hay and alfalfa. Non-irrigated crops are predominately drought resistant cereal grains (MATL 2006b).

TABLE 3.1-2
AGRICULTURAL LANDS IN THE ANALYSIS AREA

Farmland Use	Percent of Farmland[a] in Analysis Area
Irrigated Cropland	4.2
Dry Land Crops	68.7
Grazing	26.9
Wild Hay or Alfalfa	0.1

Notes:

[a] Percentage is based on the percent of parcels where all or a portion of the parcel is in the analysis area. Some parcels may indicate irrigated acres, but those acres may occur outside the analysis area. The "farmland use" category is associated with the parcel, but the location of the type is not mapped within the parcel.

Source: Montana NRIS 2006a

Management of agricultural lands includes the use of GPS guided equipment and vehicles and equipment used for irrigation, aerial and ground based spraying, mechanical plowing, seeding, fertilizing, and harvesting. Some ground based equipment has "booms" extending 90 feet on either side. These activities occur on 73 percent of the analysis area.

Publicly Managed Land

The overall Project area contains about 10 percent public lands (**Table 3.1-1**). Of these public lands, most are managed by the DNRC, FWP, BLM, and FWS (see **Figures 3.1-1, 3.1-2**, and **3.1-3**).

The State of Montana has jurisdiction over 97,318 acres within the analysis area, the majority of which is under jurisdiction of DNRC as school trust parcels. These Montana state trust lands are administered and managed for the benefit of the public schools and the other endowed institutions under the direction of the Montana State Board of Land Commissioners. The real Estate Management Bureau of DNRC's Trust Land management Division is responsible for processing applications for rights of way and easements across surface lands and navigable waterways administered by the state.

FWP manages several wildlife management areas, fishing access sites, and other wildlife and recreation areas.

The primary federal agencies with lands within the analysis area are the BLM and FWS. BLM managed land is located in scattered parcels throughout the northern half of the analysis area (**Figures 3.1-1, 3.1-2**, and **3.1-3**). Right-of-way permits for crossing U.S. BLM managed land are managed by the BLM Lands and Realty office and approved following the appropriate Resource Management Plan compatibility assessment and NEPA review process.

The FWS has management authority of the Benton Lake National Wildlife Refuge, located approximately 10 miles north of Great Falls. FWS also manages three waterfowl production areas (WPA) in the analysis area, one located approximately 6 miles west of Benton Lake, one located approximately 12 miles northwest of Benton Lake, and one located approximately 15 miles northeast of Cut Bank (**Figures 3.1-1, 3.1-2,** and **3.1-3**).

The analysis area also contains several properties owned by the U.S. Department of Defense (**Figures 3.1-1, 3.1-2,** and **3.1-3**). The primary use of such properties is managed by Malmstrom Air Force Base (CAMA 2006).

Final siting of the transmission line on public lands would require MATL to obtain permits from state or federal agencies for rights of way or easements, and would likely require compatibility assessments with these agencies to ensure that localized alignment decisions are made in accordance with the relevant management plans.

Conservation Easements

Within the analysis area are private lands managed under conditions detailed in conservation easements held by both FWS and the USDA Farm Services Agency. FWS holds several acres of wetland easements on private land in the northern portion of the analysis area. Approval to locate facilities within areas managed under wetland easement by FWS is determined by a compatibility review process, which takes into account proposed facility location and access relative to wetland avoidance on the parcel under easement.

FWP currently holds the Lewis and Clark Heritage Greenway Conservation Easement on about 2,400 acres owned by PPL Montana adjacent to the southern boundary of the analysis area. The purpose of the easement is to protect and enhance the open space, natural, and visual resources, when consistent with hydropower production and power transmission activities. The switch yard in which all alternatives would terminate is located on the northern edge of the easement.

The Farm Services Agency holds CRP easements on several thousand acres within the analysis area (**Figures 3.1-1, 3.1-2,** and **3.1-3**). CRP contracts between the Farm Service Agency and private land owners typically preclude agricultural activities on land managed under the program. Facility siting on CRP contracted land requires a compatibility review by the Farm Service Agency to determine a facility's potential impact to the CRP status of the affected property. Haying and grazing of CRP acreage are authorized under limited conditions (USDA Farm Service Agency 2006):

- Managed haying and grazing are authorized no more frequently than 1 out of every 3 years after the CRP cover is fully established. CRP participants requesting managed haying and grazing are assessed a 25 percent payment reduction except when conducted in an "emergency" area.
- Emergency haying and grazing of CRP acreage may be authorized to provide relief to livestock producers in areas affected by a severe drought or similar natural disaster.

Existing Roadway Network

Highways and roads present in the analysis area include the following:

- Federal and state highways
- Paved secondary state highways and county roads
- Improved county roads
- Unimproved roadways

Interstate 15 runs west from Great Falls to Vaughn and then north to the farming communities of Power, Dutton, Brady, and Conrad, and then to Shelby and the Border crossing at Sweet Grass. At Cut Bank the proposed power line would cross U.S. Highway 2, the primary east-west highway along the Hi-Line. North of Great Falls, the proposed power line would cross U.S. Highway 87. The analysis area includes 124 miles of Interstate 15.

Numerous secondary roads are also in the analysis area and include paved federal and state highways and improved (paved) county roads. These roadways run east-west (for example, MT 219 from Conrad to Pendroy) and north-south (for example MT 214 from Cut Bank north to Santa Rita and beyond). There are 86 miles of federal and state highways in the analysis area.

Improved county roads are primarily gravel roadways that serve rural residents. These roadways, in conjunction with improved secondary roads, provide the transportation infrastructure for ranchers and farmers within the Project area. These roads are vital to rural residents, and their use includes hauling grain and cattle and moving large farming tractors and implements. Unimproved roadways are those two-track roads that provide the farmer or rancher with access to and within their owned or leased land. There are approximately 2,346 miles of improved and unimproved county, city, and local roads in the study area.

With the exception of Interstate 15, U.S. Highways 2 and 87, and some sections of the secondary road system, the basic road infrastructure in the study area has changed little in the last 40 to 50 years. Federal and state highways have load restrictions specific to length, width, height, and weight of the transported load. Any exceedance of these criteria requires a single trip permit from MDT.

Most of the county roads have 24-foot-wide graveled driving surfaces (McDonald 2006). Some road shoulders and county bridges may not be suitable for heavy loads (McDonald 2006).

Railroad Facilities

The Burlington Northern and Santa Fe Railway northern tier mainline parallels, for the most part, U.S. Highway 2 through the project area from Shelby to Cut Bank. A north-south line runs from Great Falls through Power and on to the border at Sweet Grass (MATL 2006b). Two branch lines, one to Choteau and another to Valier serve the agricultural producers in those areas. Within the analysis area there are 171 miles of railroad.

Pipeline Facilities

Many existing pipelines serve the oil and gas producers traverse the project area including large natural gas pipelines up to 20 inches in diameter (Cut Bank to Warm Springs pipeline) and many small pipelines serve the oil fields around Conrad, Cut Bank, and Shelby. Many small (4- to 6-inch-diameter) lines from the oil fields near Cut Bank converge at "tank hill" where crude oil is collected for subsequent delivery to refinery facilities such as Montana Refining in Great Falls. Most of these lines run north-south on the western edge of the project study area with Encana's 16-inch pipeline the one east-west facility (MATL 2006b).

Aircraft Facilities

Small unmanned airports are located near the towns of Conrad, Shelby, and Cut Bank. Private airstrips are located throughout the study area that serve owners and aerial applicators that serve the agricultural producers.

Other Utilities

When MATL identified its proposed Project alignment in the MFSA application, all pipelines and transmission lines were located so as to avoid placing structures on them. Telephone companies do not have detailed comprehensive databases or maps of buried telephone lines that can be accessed for this application process. MATL would finalize siting with owners of these facilities.

Future Land Use

During scoping, several landowners provided information of planned uses within the analysis area. These include:

- Wind farms
- Additional shooting ranges and a first responder training center at the Great Falls Shooting Sports Complex
- Future conversion of some lands enrolled in the CRP to cropland.

No specific time lines were provided for these activities.

3.1.3 Environmental Impacts

This section describes potential impacts to land uses from the No Action and action alternatives.

3.1.3.1 Alternative 1 — No Action

Under the No Action alternative, the transmission line would not be constructed. There would be no additional impacts on land uses, including farming, GPS, irrigation, crop dusting, production costs, livestock control, or other activities, from transmission lines. Land uses in the area would remain similar to what they are now. Some wind farms that subscribed to the MATL facilities during the transmission open season may not be built.

No impacts would occur to transportation and utilities if the No Action alternative were selected. Current levels of infrastructure use would be maintained.

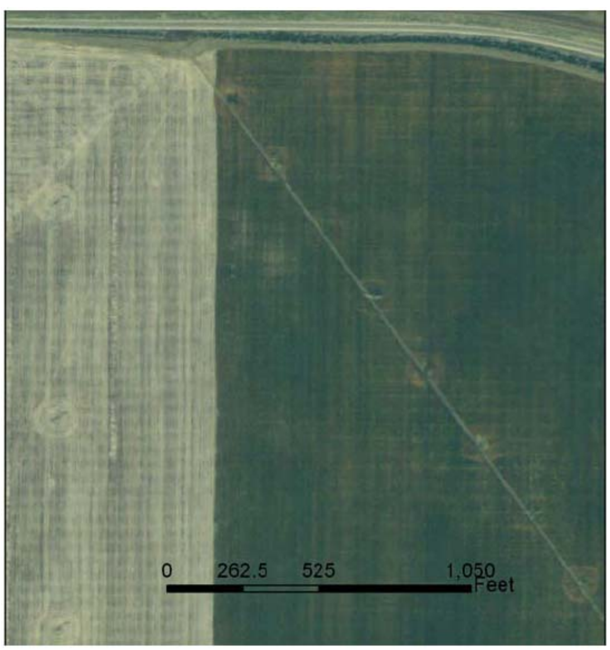
3.1.3.2 Alternatives 2, 3, and 4 — Action Alternatives

Interference with Farming

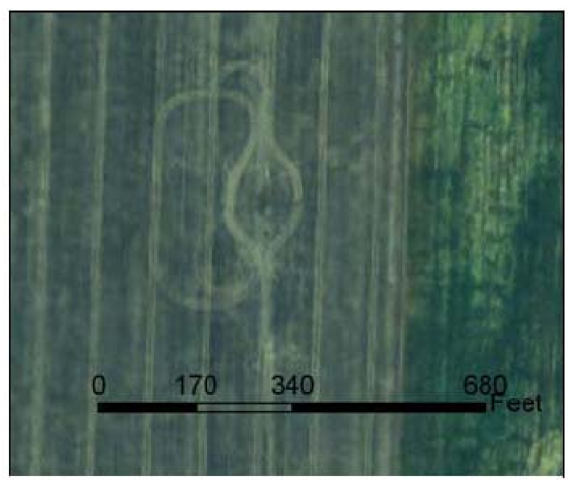
Considerable concern has been expressed by farmers whose land would be crossed by the transmission line. They have identified concerns related to a loss of production, more effort required to farm around transmission line structures, acreage that cannot be farmed due to the structures and access roads, and the introduction of weeds. **Appendix H** contains land uses by milepost for each alternative.

Mechanical irrigation, automated farming methods, farming equipment with large spans (up to 144 feet) for fertilizer, pesticide, and herbicide application, cultivation, harvesting, and crop dusting would all be affected by support structures. These effects could be substantial for an individual operator. Farming equipment continues to become larger and more automated while crops become more "high tech" requiring more precise application and timing. Farmers run the risk of costly damage to their equipment if it strikes a structure. Depending on the location, farming method, and type of structure, acreages would be taken out of production around the base of support structures, and the support structures would be in the way of all equipment (see aerial/orthophotographs below). MATL would compensate farmers for increased production costs and is in the process of revising a method for calculating production costs. This revised method is not yet available for review.

Structures located near the edge of a field may prevent equipment from reaching the edge of the field (see photographs below).



H-Frame on edge of field then diagonal crossing

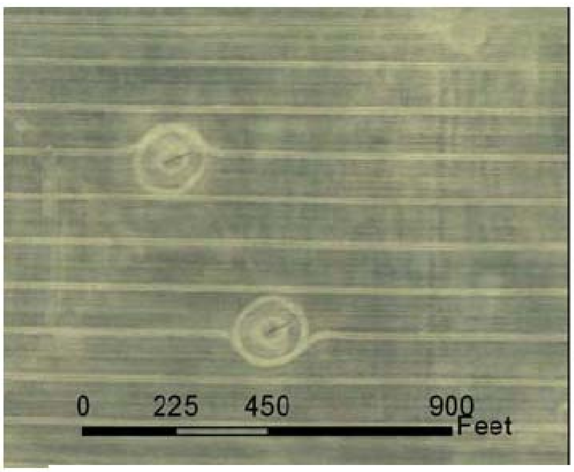


Farming around H-frame

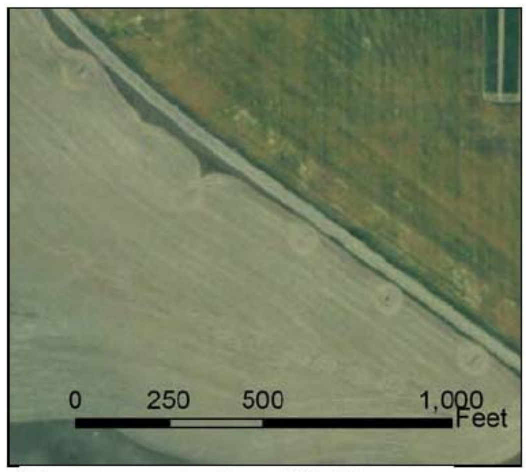
When crossing a cultivated field is necessary, in some cases, effects can be minimized by placement of H-frame structures in a north-south orientation, where the poles are parallel to the rows, avoidance of diagonal field crossings, use of monopole structures in the place of H-frames, and placing structures on the edges of fields.

The worst case scenario for loss of production area is siting H-frame structures diagonally or perpendicularly to rows and structures set close enough to the edge of a field so that farm equipment cannot fit between the structure and the edge of the field (see photograph).

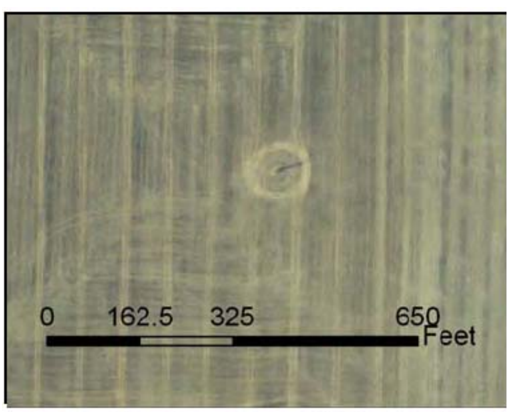
Production costs would increase as farmers have to divert their equipment around structures, make additional passes, take additional time to maneuver equipment, skip areas, or retreat areas. The efficiency of some large, GPS-guided equipment would be adversely affected in fields with diagonal crossing.



Farming around H-frame



Structures at edge of field



Farming around Monopole

Monopole along road adjacent to fields

In conducting the analysis summarized in **Table 3.1-3**, the proposed and alternative alignments were overlaid onto the 2005 orthophotographs (Montana NRIS 2006a) and photographic interpretation was used to document the land use on the alignments. **Appendix H** provides a milepost by milepost interpretation of land uses along each alignment, organized into eight land use types: (1) irrigated cropland, (2) non-irrigated cropland, (3) rangeland, (4) road and rights of way, (5) residential, (6) forest, (7) riparian, and (8) water. **Table 3.1-3** shows the miles of crossings parallel, perpendicular, and diagonal to irrigated, non-irrigated, and range fields along the alternative alignments.

Based on the miles of transmission line that would cross irrigated and non-irrigated cropland at a diagonal, the Alternative 2 alignment would interfere less with farming (52.9 miles of diagonal crossing) than the Alternative 3 alignment (70.4 miles of diagonal crossing). One percent of Alternative 2 and 5.6 percent of Alternative 3 cross irrigated cropland. Twenty-six percent of the Alternative 2 alignment crosses rangeland, compared to 18 percent of the Alternative 3 alignment.

Alternative 4 was developed by DEQ, in part, to reduce the impacts on farming from the proposed transmission line. Overall, Alternative 4 has fewer miles of the alignment crossing non-irrigated cropland at a diagonal (27.0 miles versus 52.8 miles in Alternative 2 and 63.6 miles in Alternative 3). Alternative 4 has the same number of miles of irrigated cropland crossed at a diagonal as Alternative 2 (0.1 mile). Alternative 3 has 6.8 miles.

In the development of the alternatives, several agency-proposed local realignment segments were identified to reduce the number of miles of farmland crossed diagonally, to reduce the total number of miles of farmland crossed, and to reduce the acres removed from farm production by structures. These segments and the quantitative effects on these factors are displayed in **Appendix A**.

TABLE 3.1-3
TYPES OF LAND USE CROSSED BY ALTERNATIVES 2, 3, AND 4 (MILES)

	Alternative 2				Alternative 3				Alternative 4			
	Parallel[a]	Perpendicular[b]	Diagonal[c]	Total	Parallel[a]	Perpendicular[b]	Diagonal[c]	Total	Parallel[a]	Perpendicular[b]	Diagonal[c]	Total
Irrigated cropland	1.4	0	0.1	1.5	0	0	6.8	6.8	1.2	0.5	0.1	1.8
Non-irrigated cropland	34.5	3.9	52.8	91.2	27.3	0	63.6	90.9	47.8	11.3	27.0	86.1
Rangeland	6.3	1.8	25.5	33.6	5.2	0.2	16.2	21.6	8.9	5.2	35.2	49.3
Road/Right of Way	0.2	0.9	0.2	1.3	0.1	0	0.2	0.3	0.2	0.2	0.2	0.6
Residential	0	0	0	0	0	0	0.1	0.1	0	0	0	0
Forest	0	0	0	0	0	0	0.1	0.1	0	0	0.1	0.1
Riparian	0.6	0	1.3	1.9	0.1	0	1.2	1.3	0.8	0.1	0.6	1.5
Water	0	0	0	0	0	0	0.1	0.1	0	0	0	0
Total Miles	43.0	6.6	79.9	129.9	32.7	0.2	88.3	121.6	58.9	17.3	63.2	139.6

Notes:

[a] parallel to north and south (+5° due north or south)

[b] perpendicular to north and south (+5° due north or south)

[c] diagonal to north and south

Sources: Orthophotographs 2005 (Montana NRIS 2006a); NRIS 2000; MATL 2006b; field verification; photographic interpretation (see **Appendix H**).

Land Removed from Production

Table 3.1-4 compares how many miles of transmission line cross CRP land or cropland under each alternative.

TABLE 3.1-4
ACRES OF PRODUCTION IN CRP OR CROPLAND AFFECTED BY H-FRAME OR MONOPOLE STRUCTURES IN ALTERNATIVES 2, 3, AND 4[a]

Segment	Alternative 2	Alternative 3	Alternative 4
Total Miles	129.9	121.6	139.6
Miles of Monopole Crossing CRP or Cropland	0	0	87.9
Number of Monopole Structures[b]	0	0	588 (947)[d]
Acres CRP or Cropland Removed from Production by Monopole	6	6.3	3.7 (1.4)
Miles of H-Frame Crossing CRP or Cropland	92.7	97.7	0
Number of H-frame Structures on CRP or Cropland[c]	742	782	0
Acres CRP or Cropland Removed from Production by H-frame[b]	6.53	6.88	0
Total Acres of Cropland and CRP Removed from Production[c]	**12.53**	**13.18**	**3.7 (1.4)**

Notes:

[a] MATL has provided a range of estimated disturbance for various structures and construction details as plans for the transmission line have progressed (MATL 2006b). Analysis was based on conservative estimates of area disturbed by the transmission line construction and structures.

[b] Monopoles would be set on average 790 feet apart (6.6 structures per miles for long spans), and 490 feet apart (11.5 structures per mile) for short spans.

[c] H-frames would be set on average 600 feet apart (8 structures per mile).

[d] Numbers in parentheses represent short span monopole disturbance.

Sources: Orthophotographs 2005 (Montana NRIS 2006a), NRIS 2000, MATL 2006b; field verification; photographic interpretation (see **Appendix H**)

For the purposes of this analysis, the area removed from cropland production or CRP was assumed to be 5 feet from the structure in any direction. Actual losses could be greater, for example, if a structure is located so close to the edge of a field that equipment could not maneuver between the structure and the edge of the field. Likewise, if structures are located at the edge of a field and parallel to the cropping pattern, actual losses could be minimal. A double-pole "H" frame support, the base area (1.5 feet by 23.5 feet) with 5 feet added to all sides would remove 0.0088 acre (385.25 square feet) from production per structure, whereas monopole supports (1.75 foot pole radius plus 5 feet) would remove 0.0027 acre (143.14 square feet) per structure. Based on this assumption, the 97.7 total miles of transmission line that cross cropland under Alternative 2 would result in approximately 742 H-frame structures, amounting to 6.53 acres removed from production. Alternative 3, with 97.2 total miles of transmission line that would cross cropland, would result in approximately 782 H-frame structures, amounting to 6.88 acres removed from production.

Alternative 4 would require the use of monopole structures in all areas where the transmission line would cross CRP land or cropland, 87.9 miles. Monopole structures require less of a footprint for each structure. Using long-span monopoles in Alternative 4 would result in the use of roughly 588 monopole structures and about 3.7 acres of CRP or cropland removed from production. If short-span monopole structures are used in Alternative 4, about 947 structures would be needed, and they would remove about 1.4 acres from production. Long-span monopoles would remove more acreage from production because of their 6.5-foot-wide concrete foundations. However, there would be far fewer of them to farm around.

During construction and line maintenance, short-term disruption of farming activities along the alignment could occur. Locating structures and access roads in previously disturbed areas, or in areas where agricultural practices have already been modified would minimize long-term impacts along the alignments. Environmental protection measures listed in Chapter 2 would be implemented to reduce potential impacts on land use due to erosion, soil compaction, and noxious weeds.

Interference with Crop Dusters

Experienced crop duster pilots are capable of avoiding conductors and structures by flying over, under, or around them, although additional passes may be required. Nationwide in 2005, there were 90 agricultural aircraft accidents investigated by the National Transportation Safety Board (2006). Of those 90 accidents, 14 included a power line, guy wire, or static wire as a contributing factor (two were fatal), five involved helicopters and the remainder involved airplanes. One was a helicopter that started to crash and hit a power line on the way down. None was in the Project area nor in Montana.

Alternatives 2 and 3 are similar in the number of miles of transmission line that cross agricultural lands (92.7 and 97.7 miles, respectively). Alternative 4 would cross the least amount of CRP and cropland (87.9 miles). Potential impacts would be mitigated as crop dusters would be informed of the transmission line, and maps would be provided prior to and upon completion of the MATL line.

Interference with GPS Guided Farming Equipment

Under Alternatives 2, 3, and 4, potential interference could occur to certain types of GPS systems installed in farm equipment. MATL proposes the following environmental protection measures to address problems with GPS interference:

- MATL would support upgrades to improve the GPS system's resistance to interference. Specifically, physically shielding the GPS antennae from electromagnetic interference, where practicable, would alleviate interference.

> Another potential solution is to upgrade the unit to be compatible with the Wide Area Augmentation System (WAAS). WAAS provides a more extensive coverage area and is less susceptible to signal interference. WAAS augments GPS with additional signals for increasing the reliability, integrity, accuracy, and availability of GPS.

WAAS has an accuracy specification that results in a horizontal accuracy of better than 5 meters. This accuracy would be helpful for GPS guided equipment.

Livestock Control and Gates

Issues related to controlling livestock and gate closure were raised during scoping. In response, all action alternatives include environmental protection measures to ensure gates are installed, closed, and maintained as needed to control livestock and public access in coordination with affected landowners. Although not 100 percent effective, these measures would reduce problems caused by unauthorized access or gates being left open.

Conservation Easements and Special Management Areas

Linear miles of lands under federal/state special management and those lands currently under federal or state conservation easements (wetland easements, CRP, and FWP easements) are summarized in **Table 3.1-5** for each alignment. Alternative 4 would eliminate crossing the Great Falls Shooting Sports Complex.

TABLE 3.1-5
MILES OF FEDERAL/STATE SPECIAL MANAGEMENT AREAS AND CONSERVATION EASEMENTS CROSSED

	Alternative 2	Alternative 3	Alternative 4
State Land (FWP) – Great Falls Shooting Sports Complex	0.73	0.51	0.12
Montana State Trust Land (DNRC)	10.62	5.91	11.03
Conservation Easements	23.61	(USFWS) 3.76 (CRP) 14.33	(USFWS) 1.7 (CRP) 30.77

Residential Developments

Alternatives 2 and 4 each have one developed residential area that is within 100 feet of each of the alignments. Alternative 3 has four. Impacts on residences are primarily noise and visual quality, and are discussed in those sections. As the safety zone for the transmission line is 105 feet wide, it is anticipated that the centerline would be located at least 52.5 feet from residences.

Planned Land Use

Alternatives 2, 3 and 4 cross through Glacier, Pondera, Teton, Toole, and Cascade counties. All of these counties have adopted a comprehensive land use plan. Cascade County is the only county within the Project analysis area with zoning regulations.

According to the November 15, 2006, version of the Cadastral GIS coverage for Cascade County, there do not appear to be any subdivisions planned or existing in the locations of Alternative 2 or 3 alignments. Alternative 4 crosses the planned Kyles Addition subdivision. No residences are under construction or recently completed in this subdivision.

Right-of-way Restrictions

Farming and other activities are permitted on transmission line rights of way provided that they do not interfere with line operation and maintenance or create safety problems for workers or others.

Landowners may be restricted from constructing buildings or conducting other activities within 52.5 feet of the centerline (depending on location and needed safety zone).

Pipelines

Pipelines are discussed in Section 3.3 and Section 3.4, Electric and Magnetic Fields.

Transportation

Highways and Roads
Environmental protection measures would be followed, as described in Chapter 2, that would minimize the impacts on local access roads, and impacts on highways from crossings. Some minor additional use of roads and highways would occur during construction of the transmission line. Effects would be short term.

Traffic Levels
Agriculture dominates all other land uses within the Project area. The principal activity that would increase traffic on primary, secondary, and other improved roads used by local agricultural producers is traffic associated with power line construction. Several issues would need to be addressed during this period.

A critical element would be timing power line construction and maintenance activities to avoid conflicts with farm machinery. According to Sherwin K. Smith, Executive Director of the Teton County Farm Service Agency, the farm schedule is as follows:

- Fall seeding of winter wheat, September to Mid-October
- Spring seeding of spring wheat, Mid-March to May
- Harvest, July to September or later depending on early snows.

When the existing Great Falls to Cut Bank 115-kV line was constructed in the mid-1960s, a large combine had a 20- to 24-foot header, a big drill was 32 feet, and few, if any, 4-wheel drive tractors were even available. Present day equipment has grown substantially (Broesder 2006). Some of the widths are listed below:

- Combine tread width-large unit 13.1 feet standard, up to 15.1 feet with axle extenders.
- Four wheel drive tractor dual wheels up to 18 feet wide; triples up to 22 to 24 feet wide.
- Air drills (both Case IH and New Holland)-57 foot drill when folded for transport is 20 feet 6 inches wide by 17 feet high.

From these data, conflicts with farm machinery on local roads are unavoidable especially during seeding and harvest. Timing and open frequent communication between the landowners and the contractor(s) would help to reduce impacts. Additionally, the use of pilot vehicles during equipment mobilization and delivery of large, long loads on secondary roads would serve to minimize conflict with ongoing farming activities especially during seeding and harvest.

Airports and Private Airstrips

Alternatives 2, 3, and 4 are each close to two airports, Conrad and Horner Field. The Conrad Airport is a public airport with two runways (one paved and one turf) and serves an average of 74 aircraft per week. Alternative 3 is 0.75 mile southwest of the Conrad airport. Alternative 2 is 2 miles to the southwest of the Conrad airport, and Alternative 4 is 3.7 miles to the northeast. Horner Field is a private airstrip (gravel) (Airnav.com 2006). Alternatives 2 and 3 are 1.55 miles to the east of Horner Field. Alternative 4 is 1.8 miles to the southwest. Information is not available describing the use of these facilities.

Adherence to FAA regulations and coordination of construction activities would minimize conflict with the MATL project. However, construction of the power line, whether parallel to the existing 115-kV NorthWestern line or not, would add to the existing transmission and distribution lines within the project area. Local pilots, those with private airstrips, and aerial spray pilots would be adversely impacted.

Roads and Railroad Crossing and Paralleling

Comments were raised regarding the number of crossings the proposed transmission line would make of roads and railroads.

Support structures adjacent to roads may pose a hazard to motorists, in some cases, if the vehicle leaves the roadway. Because of this, transmission line structures are normally located outside of the road right of way. Additionally, roads are commonly used by aircraft for navigation because they are located on a map and transmission lines parallel to a road could create a hazard for a few aircraft that fly less than 80 to 100 feet above the ground.

Power line construction and maintenance could increase conflicts with train traffic in the project area, especially at uncontrolled crossings. The power line would have to cross a railroad right of way or would run parallel to it at some point along its alignment (MATL 2006b).

The primary impacts to infrastructure would result from power line construction. Follow-up power line maintenance using standard equipment would be an infrequent occurrence and not add greatly to the existing traffic loads on the roadway network.

Direct impacts include increased traffic on major highways and secondary roads, minor delays along these alignments to allow equipment and material to be delivered to specific locations along the alignment, and a traffic stoppage during the conductor stringing phase.

Land Use Mitigations

To minimize adverse environmental impacts to land uses from Alternative 2 and address local land use issues in specific places, DEQ identified several potential mitigation realignments that are described by segments A1, A2, B1, B2, C1, C2, D, and E in **Appendix A.** The realignments that would mitigate land use impacts on a local scale are:

- Segment B2 - Diamond Valley and Teton River Crossing Realignment
- Segment D - Belgian Hill Realignment
- Segment E - South of Cut Bank Realignment

A description of these realignment segments and the agency's preliminary analysis of their environmental impacts are presented in **Appendix A**.

MATL has acknowledged (MATL 2006b) that the maximum cost that MATL can afford, and still meet financial requirements, is approximately $850,000. If monopole structures cost 11.3 percent more than H-frame structures, approximately 25 miles of transmission line could employ long-span monopoles. MATL also acknowledged that long-span monopole design is an appropriate mitigation design to H-frame structures for crossing dry-land croplands. However, the total additional cost must not cause the MATL project to be infeasible.

The use of monopoles would be applied to mitigate diagonal crossing of cropland using a prioritization method. The order of priority would be in the following manner:

1) Highest priority to portions of the certified alignment that cross currently farmed land (not CRP) and that parallel the existing NWE 115-kV transmission line (essentially all portions that parallel NWE's line are on a diagonal)
2) Second highest priority to portions of the certified alignment that cross land currently enrolled in the CRP and that parallel the existing NWE 115-kV transmission line (essentially all portions that parallel NWE's line are on a diagonal),
3) Third highest priority to portions of the certified alignment that cross currently farmed (not CRP) land
4) Fourth highest priority to portions of the certified alignment that cross land currently enrolled in the CRP

Specific locations (identified by mileposts) where DEQ proposes that monopoles could be applied to address local land use issues are outlined in the draft DEQ environmental specifications in **Appendix F.**

3.2 Geology and Soils

Issues of concern associated with geologic resources are: the potential for seismic activity, mass movement, subsidence, and mineral resources. Issues associated with soil resources are soil stability, potential for erosion, compaction, salinity, construction requirements for roads and access, and revegetation.

3.2.1 Analysis Methods

GIS software was used to map the distribution of geologic and soil properties that could be affected by the Proposed Project or alternatives. Geologic information was collected from U.S. Geological Survey (USGS) topographic maps, USGS seismic risk data, geologic maps and data primarily from the Montana Bureau of Mines and Geology (MBMG), and from baseline geology data provided in the MATL application (MATL 2006b). Data for important soil properties, including soil type, soil depth, soil stability, potential for erosion, compaction, salinity, limitations for roads and access, and revegetation, were acquired from the NRCS database (NRCS 2006a), the MATL application (MATL 2006b), and aerial photo interpretation. Geologic and soil resources (slope stability and erosion potential) that could be affected differently by different alternatives were evaluated and compared for each alternative alignment.

Analysis Area

The analysis area for geologic and soil resources is the same as the Project study area. The study area is generally located on relatively flat-lying plains on the eastern slope of the Northern Rocky Mountains (Northern Great Plains physiographic province).

3.2.2 Affected Environment

Geology and soils in the analysis area are described below in terms of characteristics relevant to the issues of concern stated under Section 3.2 above.

Geology

The bedrock geologic units present in the analysis area are primarily Cretaceous shales and sandstones deposited during repeated advances and regressions of the inland sea present from 65 to 135 million years before the present (MATL 2006b). The geologic formations intersected by each alignment are outlined in **Table 3.2-1**. The surface expressions of geologic formations crossed by each alignment extend across the entire analysis area and are nearly flat-lying. At the southern end of the analysis area, the dominant structural feature is the northeast trending Great Falls Tectonic Zone, which thins the Cretaceous shales and sandstones (MBMG 2002a).

TABLE 3.2-1 GEOLOGIC FORMATIONS AT THE SURFACE IN THE ALIGNMENT OF EACH ALTERNATIVE		
Geologic Unit or Formation	**Miles**	**Percent**
Alternative 2		
Glacial till, late Wisconsinan	62.48	37.5
Two Medicine Formation	51.59	31.0
Kevin Member of Marias River Formation	33.25	20.0
Telegraph Creek Formation	9.77	5.9
Virgelle Formation	3.08	1.8
Alluvium of modern channels and flood plains	1.76	1.1
Alluvium-colluvium	1.61	1.0
Taft Hill Member of Blackleaf Formation	0.92	0.5
Alluvium of alluvial terrace deposits	0.72	0.4
Lake deposits	0.71	0.4
Bootlegger Member of Blackleaf Formation	0.54	0.3
Ferdig Member of Marias River Formation	0.09	0.1
Vaughn Member of Blackleaf Formation	0.09	0.1
Landslide deposit	0.01	0.0
Alternative 3		
Two Medicine Formation	44.29	35.8
Glacial till	38.30	31.1
Kevin Member of Marias River Formation	22.85	18.5
Telegraph Creek Formation	9.00	7.3
Virgelle Formation	3.30	2.7
Alluvium of modern channels and flood plains	2.58	2.1
Alluvium-colluvium	1.89	1.5
Taft Hill Member of Blackleaf Formation	0.42	0.3
Bootlegger Member of Blackleaf Formation	0.25	0.2
Lake deposits	0.21	0.2
Ferdig Member of Marias River Formation	0.19	0.2
Alluvium of alluvial terrace deposits	0.16	0.1
Landslide deposit	0.09	0.1
Vaughn Member of Blackleaf Formation	0.05	0.0
Alternative 4		
Two Medicine Formation	44.58	31.9
Kevin Member of Marias River Formation	29.98	21.5
Glacial till, late Wisconsinan	18.84	13.5
Glacial lake deposit	8.89	6.4
Telegraph Creek Formation	7.51	5.4
Bootlegger Member of Blackleaf Formation	6.88	4.9
Alluvium-colluvium	4.34	3.1
Virgelle Formation	3.29	2.4
Alluvium of modern channels and flood plains	3.06	2.2
Vaughn Member of Blackleaf Formation	2.72	2.0
Glacial till, older	2.66	1.9
Floweree Member of Marias River Formation	1.84	1.3

TABLE 3.2-1 (Continued) GEOLOGIC FORMATIONS AT THE SURFACE IN THE ALIGNMENT OF EACH ALTERNATIVE		
Geologic Unit or Formation	**Miles**	**Percent**
Alternative 4 (continued)		
Taft Hill Member of Blackleaf Formation	1.42	1.0
Alluvium of alluvial terrace deposits	1.38	1.0
Alluvium of braided plains	1.20	0.9
Ferdig Member of Marias River Formation	1.06	0.8

The north end of the analysis area is on the west flank of the Kevin-Sunburst dome, which produces a slight westerly dip in the Cretaceous sedimentary rock of approximately 100 feet per mile (MBMG 2002b).

The sedimentary formations that underlie the analysis area include the Kootenai Formation, Blackleaf Formation, Marias River Formation, Telegraph Creek Formation, Virgelle Formation, Eagle Formation, and the Two Medicine Formation. The Marias River, Telegraph Creek, and Two Medicine formations underlie most of the analysis area. The Marias River Formation is the uppermost member and is comprised primarily of dark-gray shale with some limestone and sandstone beds; the Telegraph Creek Formation is a yellowish-gray, fine-grained sandstone with interbedded gray shale; and the Two Medicine Formation is comprised of a non-marine mudstone with thin beds of fine-grained sandstone (MBMG 2002c).

Overlying these sedimentary bedrock formations throughout most of the analysis area are deposits of glacial till, glacial lake sediments, and alluvial materials. The glacial till is composed of grayish-brown unsorted clay-size to boulder-size sediments and rock fragments (MBMG 2002c and 2002d). The thickness of the till typically ranges from 1 to 15 feet, with occasional thicknesses greater than 200 feet (MBMG 2002b and 2002c). Alluvial deposits are present in the analysis area along river and stream channels and are typically poorly sorted to well sorted sand and gravel materials that are locally derived or reworked glacial till (MBMG 2002a).

Potential for Seismic Activity

The potential for seismic activity within the analysis area is low. There are no mapped active faults in the analysis area (USGS 2006b). The nearest faults are the South Fork Flathead Fault and two small unnamed faults near the Sweetgrass Hills (MATL 2006b). The USGS has created models to estimate the peak acceleration for any area within the country. Peak acceleration is used to assess the potential impact of earthquakes on structures. The peak acceleration for the analysis area (with a 10 percent probability of exceedance within the next 50 years) is 4.5 to 6.5 percent of the force of gravity; relatively low compared to elsewhere in the U.S. (USGS 2006b).

Mass Movement

Mass movement is the relatively rapid movement of geologic materials (commonly known as a slump or slide). The potential for mass movement of soil or rock primarily depends on topography and the dip of the bedding planes of the bedrock. The general topography and bedding plane dip slopes of the analysis area are flat with small potential for mass movement. The potential for mass movement is also based on the overall shear strength of the geologic materials. Glacial till is unconsolidated and thus prone to mass movement if located on a slope of 15 percent or greater. Shale is also prone to mass movement on slopes. Areas within the analysis area having the greatest potential for mass movement are found where glacial till materials are positioned on terraces and the incised banks of the Teton River, Marias River, Dry Fork Marias, and Buckley Coulee. **Figure 3.2-1** shows areas in the study area with surficial expressions of shale and glacial till on slopes greater than 15 percent. Examination of aerial photographs of the Teton River crossing indicates there are numerous slumps on the steep slopes.

Subsidence

Subsidence can occur when voids are created in subsurface materials (sinkholes in limestone or subsurface mining) causing collapse of overlying material, or when the withdrawal of groundwater or petroleum causes geologic material to settle. The potential for the creation of voids and subsequent sinkholes within the geologic materials in the analysis area is low to nil due to the absence of limestone. No active or abandoned subsurface mines are located within the alignments of the action alternatives. Subsidence related to the withdrawal of groundwater or petroleum is also unlikely within the analysis area since petroleum is extracted at low to moderate rates and from consolidated bedrock formations. Groundwater pumping in the analysis area does not occur at rates and volumes large enough to cause subsidence.

Mineral Resources

Mineral resources include oil, gas, coal, sand and gravel, and precious metals. Petroleum deposits are found within the Cretaceous rock formations that are mapped from south of Cut Bank to the Canadian border. There are numerous producing and abandoned oil wells present across this portion of the analysis area. South of the Marias River to Great Falls, there are fewer oil wells and fewer known oil and gas deposits. The Cretaceous rock formations also contain deposits of coal.

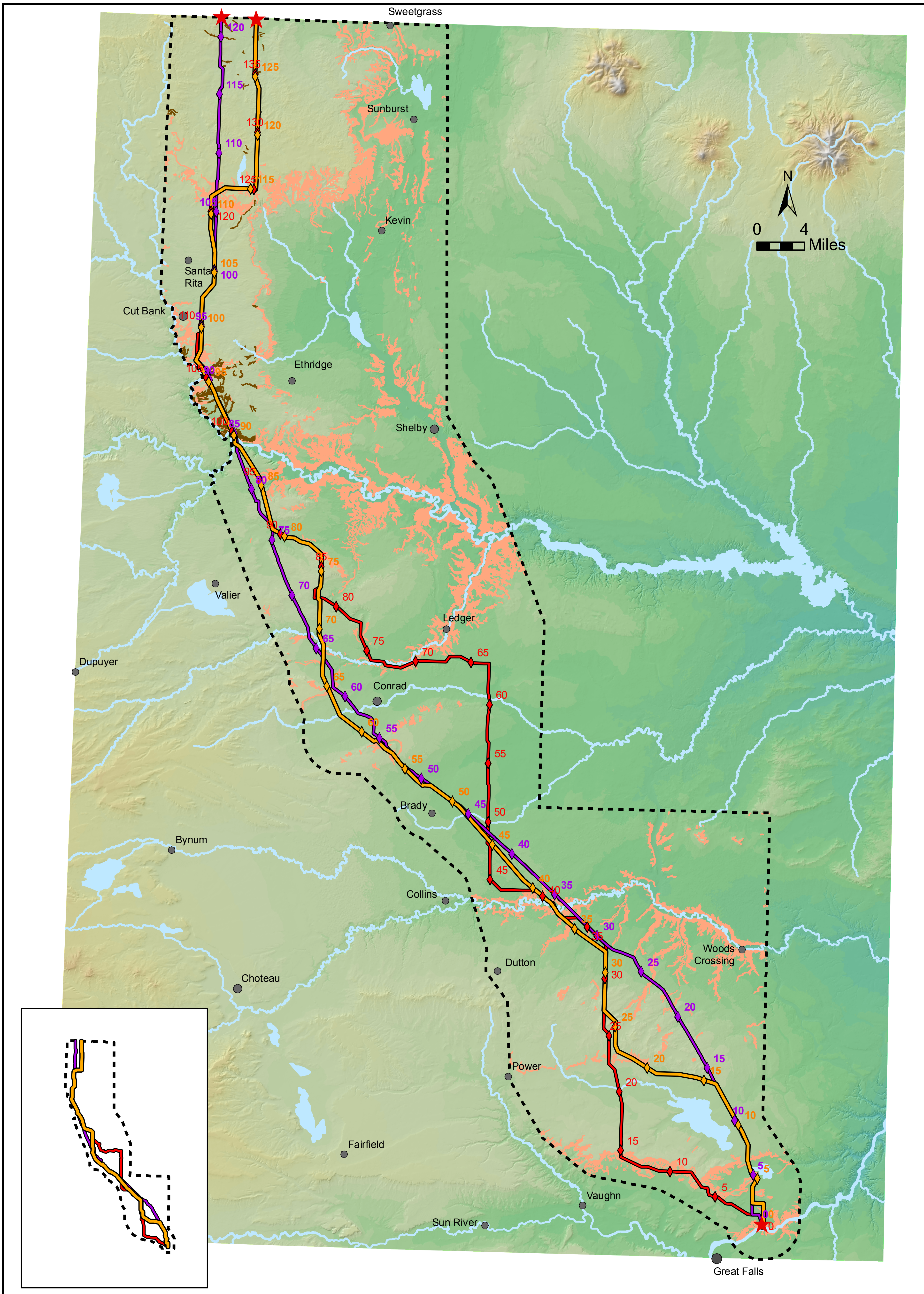


FIGURE 3.2-1
SOIL EROSION POTENTIAL

LEGEND

- GLACIAL TILL WITH HIGH MASS WASTING POTENTIAL ON SLOPES > 20%
- SOILS WITH HIGH MASS WASTING POTENTIAL ON SLOPES > 20%
- ALT2 - ALIGNMENT
- MILE MARKERS
- ALT3 - ALIGNMENT
- MILE MARKERS
- ALT4 - ALIGNMENT
- MILE MARKERS
- CITIES AND TOWNS
- ALIGNMENT END AND EXIT POINTS
- STUDY AREA BOUNDARY
- MAJOR HIGHWAYS
- SECONDARY ROADS
- RIVERS AND STREAMS

NOTE:
ALT = ALTERNATIVE

GIS map by Ed Madej -TTEMI-HE Fig3_2-1_MATL_erosian_potential_012007.mxd

Soils

The kinds of soils that have developed in the analysis area are determined by five major factors: (1) climate; (2) living organisms; (3) parent material; (4) topography; and (5) time. Three of the five factors have had a major influence on soil development in the analysis area; they are climate, parent material, and topography. The colder, semi-arid climate has caused soil profiles to be shallow compared to soils from warmer and wetter locales. As discussed in the Geology section above, soils that develop on shale and sandstone bedrock have considerably different parent materials than soils that develop from glacial till and glacial outwash sediments. In addition, topography has local influences due to the erosional downcutting and steeper slopes associated with the major Marias and Teton stream drainages and their associated tributaries.

Soils that form on relatively flat deposits of glacial till are mostly well-drained and fine-textured soils. These soils are suitable for agriculture and rangeland and are rated fair to good for growing grasses, low to moderate for frost action, and high for corrosion of steel (NRCS 2006a). Most of the soils within the MATL analysis area that have developed from the glacial till deposits are classified in the Mollisol soil order (NRCS 2006a). Other soil types, with lesser areal coverage than Mollisol soils, are classified in the Entisol, Inceptisol, and Vertisol soil orders. Only very small areal amounts of Alfisols and Aridisols soils are found within the analysis area.

Soils in the Mollisol soil order characteristically have a dark-colored, relatively thick, and organically rich surface horizon that developed under thousands of years of grassland vegetation (Soil Science Society of America [SSSA] 1997). Within the analysis area, the Mollisol soils typically have a fine- to fine-loamy-grained texture, are well drained, and have formed on stream terraces, alluvial fans, and glacial till plains with slopes less than 10 percent.

Soils in the Entisol soil order are younger and weakly developed soils, compared to Mollisols, with little, if any, profile development (SSSA 1997). Entisol soils are found on very recent geomorphic surfaces (Brady 1990). Within the analysis area, Entisol soils typically are well-drained soils with a fine-loamy to loamy-grained texture. Entisol soils are mapped on flood plains, glacial till plains, and hills with slopes up to 60 percent within the MATL analysis area.

Soils in the Inceptisol soil order are also weakly developed soils with few diagnostic features but are considered to be more developed than the Entisol soils. These soils typically have a subsurface mineral horizon with some weatherable minerals that have been slightly altered or leached (SSSA 1997). Within the analysis area, the Inceptisol soils typically have a fine- to fine-loamy-grained soil texture. These soils are well drained and can produce good agricultural crops under proper management (Brady

1990). In the MATL analysis area, Inceptisol soils have formed on alluvial fans, glacial till plains, and hills with slopes less than 45 percent (NRCS 2006a).

Soils in the Vertisol soil order are mineral soils with greater than 30 percent clay. Within the analysis area, the Vertisol soils have formed from finer-grained glacial sediments that were deposited by glacial outwash. These soils can be well drained under proper management, but will form deep wide cracks when dry (SSSA 1997). Vertisol soils in the analysis area typically have a very fine- to fine-grained texture and are found on alluvial fans, glacial till plains, and lake plains with slopes less than 10 percent.

Soil Stability and Erodibility

The stability and potential for erosion of these soils are primarily dependent on the particle size, slope, and potential for mass movement. Fine-grained soils are more susceptible to wind and water erosion than coarser soils, and soils on steep slopes are more prone to erosion than soils located on relatively flat terrain. Steep slopes are also required for the mass movement of soils.

The majority of the MATL analysis area contains relatively flat terrain. Exceptions are the steep slopes associated with the bluffs north of Great Falls and stream banks along the Teton River, Dry Fork of the Marias River, and Marias River. Mass movement of soils is occurring within the analysis area along the Teton River. Areas of highly erodible or unstable soils (soils on slopes greater than 15 percent) within alternative alignments are shown in **Figure 3.2-1**.

Compaction

The degree to which soils may become compacted from farming or construction operations is primarily dependent on the surface soil grain size, the mineral composition of the soil, and the moisture content. Soils with high silt and clay content are more susceptible to becoming compacted than sandy soils under the same moisture conditions. Moist soils are more prone to compaction for all soil texture and mineral types. Dry soils are less susceptible to compaction than wet soils, but dry soils produce more dust that is eroded by wind. Many of the soils within the MATL analysis area have fine-grained surface soil textures and will be prone to compaction by construction equipment, if adequate soil moisture is present. This may be especially true with cement trucks delivering concrete for long-span monopole foundations.

Salinity

Salinity is a measure of the salt content of the soil. Highly saline soils inhibit the growth of vegetation due to the increased osmotic potential exerted by the salts in the soil solution. Revegetation of disturbed areas with highly saline soils may be problematic. Most of the soils within the analysis area have low to moderate salinity and small areas of saline soils could be avoided. Revegetation success should not be influenced by saline soils in the analysis area with the exception of saline seep areas.

Roads and Access

Roads are best constructed on soils with coarse-grained surface soil textures, compared to soils with surface soils with fine-grained textures. Many soils in the MATL analysis area have fine-grained surface soil textures and may not be suitable for building temporary or permanent roads.

Revegetation

The soils within the MATL analysis area are mostly rated fair to good for growing grasses. The reestablishment of range or cropland vegetation on the disturbed lands should be successful if standard fertilization and seeding methods are implemented.

3.2.3 Environmental Impacts

Potential impacts to geologic and soil resources from the four alternatives are described in this section. The difference among action alternatives depends on the competency of the bedrock, soil type, slope, and disturbance activities that would take place at a given location. Resource characteristics that could be affected differently by each action alternative are slope stability (due to mass movement) and soil stability (due to erosion). Increasing the risk of mass movement could not only result in slope instability, but also compromise the integrity of transmission line support poles. Increasing soil erosion could result in the loss of topsoil, reduced effectiveness of vegetation efforts during reclamation, and increased sedimentation to surface water. Increased soil compaction would also reduce the effectiveness of reclamation efforts in the selected alignment.

Other geologic and soil characteristics (seismicity, subsidence, mineral resources, salinity, road substrate material, and compaction) are similar throughout the analysis area. Impacts to (and from) these resources would be the same for all alternatives and are described below.

3.2.3.1 Alternative 1 — No Action

The No Action alternative would not affect geology or soil resources beyond current impacts from farming, road building, and construction activities.

3.2.3.2 Alternative 2 – Proposed Project

Areas within the Alternative 2 alignment that are prone to impacts, including slope stability (due to mass movement in areas underlain by glacial till and shale on a slope), soil stability (due to erosion on slopes), and soil compaction, are shown on **Figure 3.2-1**. Overall, with successful implementation of the MATL proposed environmental protection measures and the required DEQ environmental specifications, impacts to soils and geology under Alternative 2 would be minor and primarily of short duration.

Mass Movement

Mass movement is likely to occur on incised banks and steep slopes primarily where the alternative alignment crosses streams and rivers. Mass movement could result in the shifting or collapse of transmission line poles and would likely contribute to the sediment load of nearby surface water. Mass movement occurs naturally and can be exacerbated by ground disturbance and heavy equipment associated with the construction of the transmission line. The risk for mass movement is greatest in the Black Horse Lake area (milepost 5), the north side of the Teton River (milepost 35 to 40), and at the Marias River crossing (milepost 88 to 91). MATL would implement erosion and sediment control practices as provided in its application (MATL 2006b) and required by the State of Montana (**Appendix F**). Additional mitigation measures may include precision mapping of unstable soils along these segments of the Alternative 2 alignment and providing an alignment wider than 500 feet to allow flexibility in pole placement, so future landslides do not adversely affect the proposed line.

Soil Stability and Erodibility

Areas prone to soil stability and erosion are shown on **Figure 3.2-1**. Soil stability and erodibility are primarily dependent on soil texture, slope, and degree of disturbance. Soils along much of Alternative 2 are fine-grained and are prone to erosion when the vegetative cover is disturbed, which would be primarily during construction activities. The greatest potential for soil erosion for Alternative 2 would be from the construction of access roads along the banks of the Teton and Marias rivers. Implementing soil and erosion control measures would help minimize the formation of gullies.

Compaction

Soils may become compacted under all action alternatives, especially during the construction phase. MATL has committed to stripping topsoil, by sidecast methods, for new access roads and replacing the sidecast soils following construction. MATL has also developed specific mitigation measures for soils, including providing an erosion control plan and implementing best management practices (water bars, drainage contours, straw bales, filter cloth, or similar) for areas with susceptible soils to minimize impacts to soils.

3.2.3.3 Alternative 3 – MATL B

Alternative 3 is 8.3 miles shorter than the Alternative 2 (121.6 miles vs. 129.9 miles) due to more diagonal segments along the entire alignment. The potentials for mass movement and unstable soils are similar to those under Alternative 2, but the lengths of the alignment with the potential for mass movement and the occurrence of unstable soils are less under Alternative 3.

Mass Movement

Mass movement impacts and mitigations would be similar to Alternative 2. The risk for mass movement is greatest within the historic channel of the Teton River (milepost 32 to 34) and at the Marias River crossing (milepost 84 to 85). MATL would implement erosion and sediment control practices as provided in its application (MATL 2006b) and required by the State of Montana draft Environmental Specifications (**Appendix F**).

Soil Stability and Erodibility

Areas prone to soil stability and erosion problems are shown on **Figure 3.2-1**. About 12 miles of Alternative 3 are located on unstable soils on slopes greater than 15 percent. Soil stability and erodibility are primarily dependent on soil texture, slope, and degree of disturbance. Soils along much of Alternative 3 are fine-grained and are prone to erosion when the vegetative cover is disturbed, which would be primarily during construction activities. The greatest potential for soil erosion for Alternative 3 would be from the construction of access roads along the banks of the Teton and Marias rivers. Implementing soil and erosion control measures would help minimize the formation of gullies.

3.2.3.4 Alternative 4 – Agency Alternative

Alternative 4 is 139.6 miles in length, which is about 9.7 miles longer than the proposed Project (129.9 miles). This alternative is composed of 60.9 miles of the Alternative 2 alignment and 78.7 miles of agency-developed alignments that branch off the Alternative 2 alignment. The 78.7 miles of agency alignments were developed to address identified local scoping issues and concerns. The potentials for mass movement and unstable soils are similar to those under Alternatives 2 and 3, but the lengths of the alignment with the potential for mass movement and the occurrence of unstable soils are greater under Alternative 4 primarily due to the alignment of the alternative along the Dry Fork of the Marias River and Marias River.

Mass Movement

Mass movement impacts and mitigations would be similar to Alternative 2. The risk for mass movement is greatest within the historic channel of the Teton River (milepost 36 to 42), along the Dry Fork of the Marias River (milepost 70 to 82), and at the Marias River crossing (milepost 98.5 to 100.5). MATL would implement erosion and sediment control practices as provided in its application (MATL 2006b) and required by the State of Montana (**Appendix F**).

Soil Stability and Erodibility

Areas prone to soil stability and erosion problems are shown on **Figure 3.2-1**. About 24 miles of Alternative 4 are located on unstable soils on slopes greater than 15 percent. Soil stability and erodibility are primarily dependent on soil texture, slope, and degree of disturbance. Soils along much of Alternative 3 are fine-grained and are prone to erosion when the vegetative cover is disturbed, which would be primarily during construction activities. The greatest potential for soil erosion for Alternative 4 would be from the construction of access roads along the banks of the Teton, Dry Fork of the Marias, and Marias rivers. Implementing soil and erosion control measures would help minimize the formation of gullies.

3.3 Engineering and Hazardous Materials

3.3.1 Analysis Methods

Engineering concerns pertain to transmission line support structures and the impacts of these structures associated with crossing contaminated sites, pipelines, other transmission lines, major highways, streams, and rivers.

Analysis Area

The analysis area for engineering and hazardous materials includes the proposed power line alignments, staging locations, and a 1-mile buffer zone on each side of the proposed alignments.

Information Sources

Information for the analysis of engineering resources was obtained from the MATL MFSA application (MATL 2006b). Information sources for hazardous materials in the affected environment included the online U.S. Environmental Protection Agency (EPA) Region 8 Superfund Site Locator (EPA 2006c), the online Montana NRIS (2006b), and field observation of oil and gas extraction operations within the analysis area.

Methods used to analyze the potential impacts of alternatives 2, 3, and 4 included evaluation of proposed alignments with respect to mapped hazardous materials in the analysis area and evaluation of proposed activities with respect to potential use and generation of hazardous materials.

3.3.2 Affected Environment

Proposed Transmission Line Design

The transmission line would be designed, constructed, operated, and maintained in accordance with the NESC, U.S. Department of Labor OSHA Standards, and other guidance as appropriate for safety and protection of human life and the environment.

Federal Superfund Sites

A review of the online EPA Region 8 Superfund Site Locator indicates that there are no federal Superfund (Comprehensive Environmental Response, Compensation, and Liability Act, or CERCLA) sites located within the Project area. The closest federal Superfund sites to the project area are the Barker Hughesville historic mining district and the Carpenter-Snow Creek mining district, both of which are on the federal

National Priorities List. Both of these sites are located southeast of Great Falls. Barker Hughesville mining district is 36.2 miles to the southeast of Great Falls. Carpenter-Snow Creek mining district is 46 miles to the southeast of Great Falls.

State Superfund Sites

There are four state Superfund sites located within the Project area. Conrad Refining Company, 1 mile south of Conrad, is an inactive, 9-acre oil refinery, which operated from 1929 to 1941. Refinery operators disposed of sludge in on-site pits. Midwest Refining Company, in Conrad near Front Street and Second Street South, is an inactive, 0.9-acre former oil refinery which was in operation around 1929. Little historic or other information is available about the facility. Union Oil-Cut Bank Refinery (also known as the Flying J Refinery), 3 miles southeast of Cut Bank, is an inactive crude oil refinery and natural gas processing plant which operated from 1937 to 1983. The Carter Oil Company Cut Bank Refinery is located 1 mile west of Cut Bank on the Blackfeet Indian Reservation. The Conrad Refining Company site is within 1,000 feet of the Alternative 2 alignment. The other sites are not affected by any transmission line alignment.

Oil and Gas Operations and Pipelines

Numerous oil and gas fields are located within the northern portion of the analysis area. All action alternatives would traverse areas with operating oil and gas extraction wells, well waste pits, oil and gas storage systems, and pipelines. A variety of pipelines between 8 and 20 inches in diameter occur within or traverse the Project study area including gathering system main lines and transmission/trunk lines. These pipelines are used to transport either crude oil or natural gas. Four major pipelines exist in a broad corridor between the Canadian border and Cut Bank; six major pipelines exist between Cut Bank and Great Falls. With the exception of an Encana Corporation 16-inch natural gas pipeline, which runs from east to west, primary routes for the main transmission/trunk lines generally run south to north and are located in the western portion of the Project study area.

Crude oil pipelines in the analysis area were located based on information provided by several sources including Front Range Pipeline Company, USGS topographic maps, agency field notes from the fall of 2006, review of 2005 aerial photographs, NRIS mapping, and the Montana Board of Oil and Gas Conservation. Crude oil pipeline data contained in the NRIS database (Montana NRIS 2006a), or provided by the above referenced sources include:

- Two Continental crude oil pipelines are located east of Great Falls running northwest approximately parallel to the Proposed Project and alternatives. The pipelines are 12 inches and 18 inches in diameter. These pipelines run from east of Great Falls through

Portage, Cascade County, to Cut Bank and beyond. These pipelines are crossed in the vicinity of Cut Bank by alternatives 2, 3, and 4.

- Two Front Range Pipeline Company 10-inch mainlines, one 6-inch mainline, and one 16-inch mainline start at the U.S.-Canada border and end at the Santa Rita pump station.
- One Front Range Pipeline Company 16-inch mainline that starts at Santa Rita station and ends in Laurel, Montana.
- One Front Range Pipeline Company 8-inch mainline starts at the Santa Rita station and ends at the Cut Bank station.
- One Front Range Pipeline Company 10-inch pipeline that starts at the U.S.-Canada border and ends at the Santa Rita pump station.

Additional smaller natural gas pipelines are likely located within the analysis area and may be crossed by alignments associated with alternatives 2, 3, and 4.

3.3.3 Environmental Impacts

3.3.3.1 Alternative 1 — No Action

The MATL transmission line would not be built. There would be no engineering or hazardous materials concerns if the No Action alternative were selected.

3.3.3.2 Alternatives 2, 3, and 4 – Action Alternatives

Proposed Construction

The 500-foot-wide Alternative 2 alignment would come within 100 feet of an existing pipeline for a total length of 7.0 miles. The Alternative 3 alignment would come within 100 feet of an existing pipeline for a total of 23.7 miles, and the Alternative 4 alignment would come within 100 feet of an existing pipeline for a total of 5.7 miles. No adverse impacts from proximity to pipelines are expected. However, the risk for potential pipeline damage increases with an increase in length of alignment proximal to a pipeline. No short-term adverse impacts would be associated with transmission line construction tasks.

Proposed Operations Maintenance

No long-term adverse impacts would be associated with operation and maintenance of the transmission line. Wood H-frame structures generally require more maintenance than steel structures and have a shorter useful life. Wood H-frame structures should meet the operational life of the proposed transmission line.

Impacts to buried utilities such as pipelines are considered to be of little consequence; however, should the power line be located near and parallel to an existing pipeline, a separation of 0.5 mile would be recommended to minimize electric field effects. Additional discussion on the safety of co-locating a transmission line with a pipeline is provided in Section 3.4.3.

Federal and State Superfund Sites

No federal or state Superfund sites would be affected by any of the proposed alignments.

3.4 Electric and Magnetic Fields

This section describes background information regarding impacts from electric and magnetic fields (EMF) and corona effects, and evaluates the action alternatives for impacts on human health and safety.

Both current and voltage are required to transmit electrical energy over a transmission line. The current, a flow of electrical charge, measured in amperes (A), creates a magnetic field. The magnetic field is expressed in units of milligauss (mG). The voltage, the force or pressure that causes the current to flow, measured in units of volts (V) or thousand volts (kV), creates an electric field. Both fields occur together whenever electricity flows, hence the general practice of considering both as EMF exposure. Any device connected to an electrical outlet, even if the device is not turned on and current is not flowing, will have an associated electric field that is proportional to the voltage of the source to which it is connected. Magnetic fields occur only when current is flowing. Common materials such as wood and metal usually do not shield against magnetic fields.

In recent years the possibility of deleterious health effects from EMF exposure has increased public concern about living near high-voltage lines. The available data have not revealed any conclusive evidence that EMF exposure from power lines poses a hazard to animal or human health. However, while such a hazard has not been established from the available evidence, the same evidence does not serve as proof of a definite lack of a hazard and some studies provide preliminary evidence that a linkage may exist between exposure to magnetic fields and childhood leukemia. In light of the present uncertainty, this section contains a summary of the existing credible scientific evidence relevant to evaluating the potential impacts of EMF.

This section also addresses safety considerations in the immediate vicinity of transmission lines. Additionally, the potential for corona effects on the human environment from transmission lines is discussed. Corona is the electrical breakdown of air into charged particles caused by the electrical field at the surface of conductors, the wires that carry electricity. Corona effects are of concern for potential audible noise, interference with radio, television, and other electrical devices, such as Global Positioning System (GPS) equipment, production of visible light, and photo chemical reactions.

3.4.1 Analysis Methods

The EMF effects of the transmission lines were calculated for a range of distances from the transmission line. In general, the farther removed a person is from the transmission line, the lower the EMF strength. A number of different scenarios were tested in the calculations. Because the magnetic field varies with the current carried on the transmission line, magnetic field strength was calculated for the normal anticipated current load of 230 kV per circuit. In the optimized phasing orientation, the phases of the single circuit are offset to minimize the EMF strength. As described in Section 3.4, the focus of EMF health studies and the focus of the following impacts analysis are on magnetic fields, although electric fields are included for completeness.

Since MATL's policy is to minimize EMF exposure levels to the extent practicable, MATL would use the vertical optimized phasing orientation for the single-circuit line. Results from the non-optimized phasing orientation are included for comparison purposes only. The calculations evaluate EMF strength at a range of distances from the centerline of the transmission line, both within and outside the approximate 105 feet safety zone, and for the portion of each span where the conductors are closest to the ground. The magnetic field is expressed in units of mG; the electric field is expressed in units of kV/m.

The potentials for corona effects and effects on safety are also evaluated. The nearest potential receptors to the transmission line based on the proposed and alternative alignment are listed for each alternative, including residences, schools, and commercial establishments.

Analysis Area

Based on the use of the single circuit, H-frame structure transmission line, the analysis area for human health effects from electric and magnetic fields would include the right of way with 30 feet to either side as a safety zone. This totals 105 feet along each alignment. According to the permit to construct, the safety zone can be adjusted if necessary to meet the electric field requirements set forth by the State of Montana of 1 kV/m at the edge of the right of way (safety zone) in residential and subdivision areas.

Information Sources

General EMF data were researched from the American Conference of Governmental Industrial Hygienists, the Institute of Electrical Engineers, the California Department of Health Services, the National Institutes of Health, World Health Organization, journal articles, and the National Institute of Environmental Health Sciences (NIEHS).

3.4.2 Affected Environment

The affected environment is described in terms of both magnetic and electric health concerns.

Magnetic Field Health Concerns

In recent years, the focus of the EMF health studies for power lines has been on the magnetic fields created by the power lines. These studies investigated the potential that EMF exposure will increase the risk of cancer, leukemia, miscarriages, and other diseases.

A 60-Hertz (Hz) magnetic field is created in the space around transmission line conductors by the electric current flowing in the conductors. This is the frequency of ordinary household current, usually referred to as 60 cycle. The strength of the magnetic field produced by an electric transmission line depends on the electrical load, the configuration of the conductors (spacing and orientation), the height of the conductors, the distance from the line, and the proximity of other electrical lines. As the load on a transmission line varies continually on a daily and seasonal basis, the magnetic fields likewise vary throughout the day and year. Magnetic fields are highest closer to the line and diminish with distance. Physical structures, such as buildings, are transparent to magnetic fields created by power lines, thus fueling the interest in potential health effects.

Existing EMF levels in the project vicinity are primarily dominated by EMF from common household appliances. EMF levels of some common household appliances are listed in **Table 3.4-1**. This table shows that the magnetic fields at a distance of 3 feet range from less than 0.1 mG to 18 mG.

TABLE 3.4-1
EMF LEVEL OF SOME COMMON HOUSEHOLD APPLIANCES

Appliance	Magnetic Field at 3 feet (mG)
Clothes dryers	0.0 to 1
Clothes washers	0.2 to 0.48
Electric shavers	Less than 0.1 to 3.3
Fluorescent desk lamp	0.2 to 2.1
Hair dryers	Less than 0.1 to 2.8
Irons	0.1 to 0.2
Portable heaters	0.1 to 2.5
Television	Less than 0.1 to 1.5
Toasters	Less than 0.1 to 0.11
Vacuum cleaners	1.2 to 18.0

Notes:
EMF = electric and magnetic field
mG = milligauss
Source: Waveguide 2003

Existing transmission and distribution lines also contribute to EMF levels. **Figure 3.4-1** shows the existing 115-kV transmission lines in the project vicinity. As an example of maximum existing EMF, MATL has modeled EMF levels from the existing 115-kV transmission lines that run through the proposed project area. At a distance of 49 feet from the existing 115-kV transmission line (which coincides with the proposed location of MATL's new transmission line), the magnetic field is 6.5 mG and the existing electric field is 1.75 kV/m. At a distance of 200 feet from the existing 115-kV transmission line (which coincides with the edge of the safety zone of MATL's proposed transmission line), the magnetic field is 0.4 mG and the electric field is 1.06 kV/m. The existing EMF level at the edge of the proposed safety zone is expected to be below an average daily exposure to magnetic fields from some common household appliances (approximately 0.8 mG) (NIEHS 1999).

No Federal or state regulations are in effect specifying environmental limits on the strengths of magnetic fields from power lines. However, the state of Montana has adopted an electric field exposure value of 1 kV/m edge of right-of-way standard in residential and subdivided areas unless waived by the landowner and a 7 kV/m standard for road crossings. Some non-governmental organizations have set advisory limits on EMF as a precautionary measure, based on the knowledge that high field levels (more than 1,000 times the EMF found in typical environments) may induce currents in cells or nerve stimulation. The International Commission on Non-Ionizing Radiation Protection has established a continuous electric field exposure limit of 4.2 kV/m, and a continuous magnetic field exposure limit of 833 mG for members of the general public (NIEHS 2005).

Electric Field Health Concerns

Safety considerations in the immediate vicinity of electric power lines include the potential for electric shock, the clearance of the power lines above ground, measures to prevent unauthorized climbing of the poles, and the proximity of the transmission lines to other utilities such as oil wells and pipelines.

The electric field created by a high-voltage transmission line extends from the energized conductors to other conducting objects such as the ground, towers, vegetation, buildings, vehicles, and persons. Potential field effects can include induced currents, steady-state current shocks, spark discharge shocks, and in some cases field perception and neurobehavioral responses.

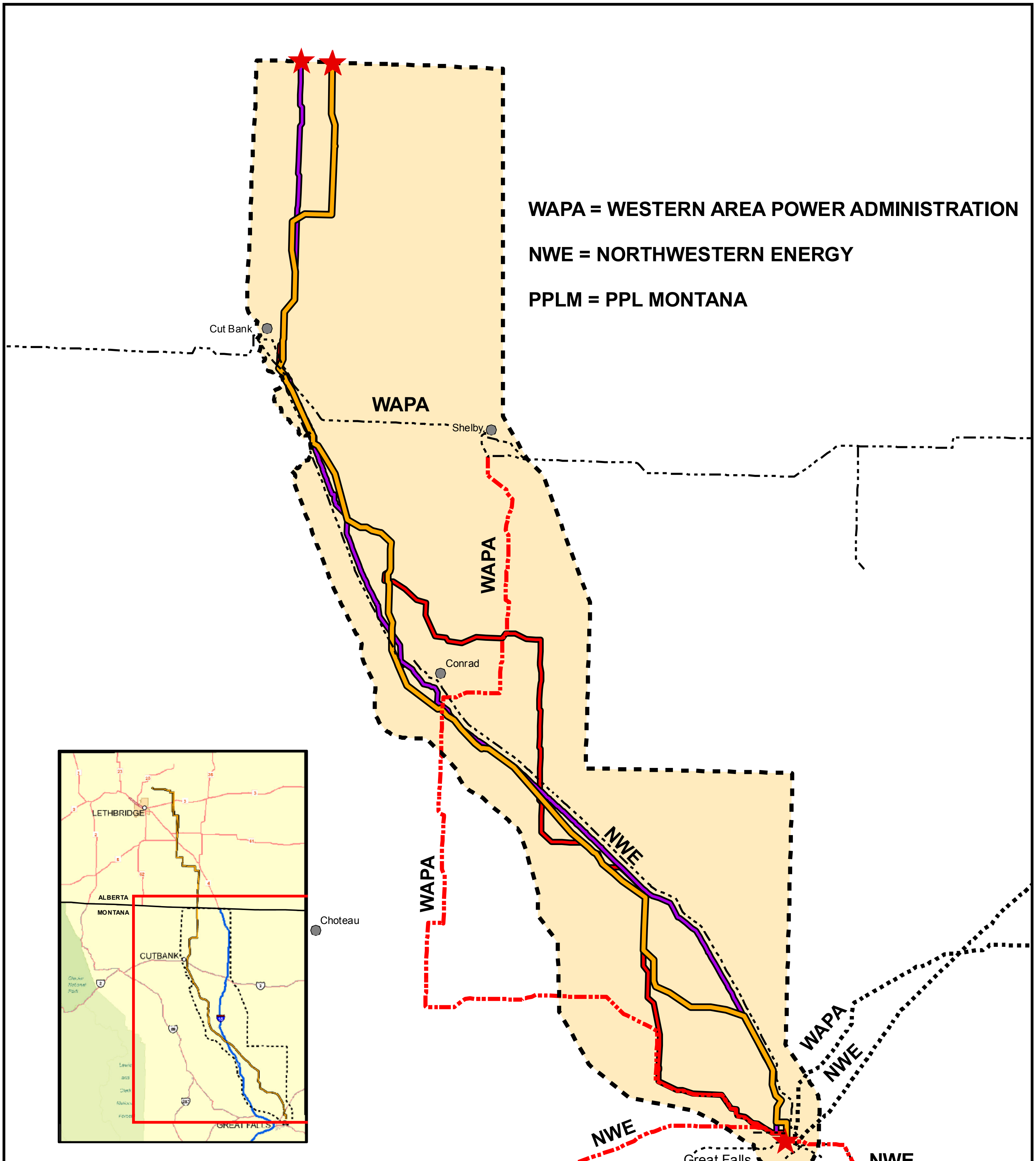


FIGURE 3.4-1
EXISITNG TRANSMISSION LINES LARGER THAN 69kV IN PROJECT VICINITY

LEGEND

- 230kV POWERLINE
- 161kV POWERLINE
- 115kV POWERLINE
- 100kV POWERLINE
- CITIES AND TOWNS
- ALIGNMENT END AND EXIT POINTS
- STUDY AREA
- ALT2 - ALIGNMENT
- ALT3 - ALIGNMENT
- ALT4 - ALIGNMENT

NOTE:
ALT = ALTERNATIVE

GIS map by Ed Madej -TTEMI-HE Fig3_4-1_MATL_Transmission_Lines_letter_012207.mxd

Sparking and Shocks

In a high electric field, it is theoretically possible for a spark discharge from the induced voltage on a large vehicle to ignite gasoline vapor during refueling. However, the probability for the precise conditions to occur for ignition is extremely remote. According to the Conrad-Shelby EIS (DOE 1986), the ignition of fuel under a transmission line would require that an individual be standing on damp earth or vegetation and that the vehicle to be refueled must be exposed to the maximum intensity of the electric field. The vehicle must also be insulated. Finally, the air-fuel mixture must approach optimal flash-point conditions. Therefore, the number of precise conditions to be met to achieve fuel ignition reduces the likelihood of the occurrence. In the event fueling is to be done under a power line, grounding is recommended.

Short Circuit Currents

When a conducting object, such as a vehicle or person, is placed in an electric field, currents and voltages are induced. Some representative short-circuit currents in undisturbed electric fields of 1 kV/m and 3.5 kV/m are provided in **Table 3.4-2**.

TABLE 3.4-2
SHORT CIRCUIT CURRENTS FOR VARIOUS OBJECTS IN MILLIAMPERES (MA)

	Electric Field	
Object	**1 kV/m**	**3.5 kV/m**
Person (5’8” tall)	0.016	0.06
Cow	0.024	0.08
Sedan	0.11	0.40
Camper truck (28’long)	0.28	1.00
Large trailer-truck (65x8.5x13.5)	0.93	3.30
Large haystacker and 4wd tractor	0.89	3.10
3- strand fence (200’ long)	0.30	1.10

Source: Conrad –Shelby Transmission Line EIS (DOE 1986)

Based on the length requirements set forth by the U.S. Department of Transportation, the longest permitted truck in Montana is 65 feet. This is also the longest anticipated vehicle under the proposed transmission line with a short-circuit current of 0.93 milliampere (mA)/kV/m. Large farm equipment, such as hay wagons, sprayers, and combines, would also have large short-circuit currents but would not exceed the NESC criterion of 5 mA. Therefore, under worst case scenario conditions the short circuit current to the largest anticipated vehicle is 3.3 mA, which is less than the NESC criterion of 5 mA. The maximum height of a vehicle or piece of equipment passing under a transmission line should not be higher than 14 feet (NESC). If a person provides the only conducting path from the object to the ground, then the currents listed in **Table 3.4-2** flow through the person, when the person touches the object and the object is below the line. Based on the action alternative descriptions, all equipment being operated around the transmission line should be properly grounded. In summary, electric field health concerns are:

- *Steady-State Current Shock* – Steady-state currents are those that flow continuously after a person contacts an object, such as a vehicle, and provides a path to ground for the induced current. The effects of these shocks range from involuntary movement in a person to direct physiological harm. Steady-state current shocks occur in instances of direct or indirect human contact with an energized transmission line. An example of indirect steady-state current shock would be similar to the incident that occurred when a young farm worker touched a grain auger to a transmission line while in contact with the auger. Based on the investigations by NIOSH following the incident, the current entered the worker through his hands and exited through his left foot. The worker therefore became the exit point for the steady state current. Injuries are more likely to result with lower voltage power lines than in higher voltage lines because contact is more likely. The electrical conductors of lower voltage lines are closer to the ground, smaller, and less noticeable.
- *Spark-Discharge Shocks* – Induced voltages appear on objects such as vehicles when there is an inadequate ground. If the voltage is sufficiently high, a spark-discharge shock will occur as contact is made with the ground. Spark-discharge shocks that create a nuisance occur in instances of carrying or handling conducting objects, such as irrigation pipe, under (not touching) transmission lines.
- *Field Perception and Neurobehavioral Responses* – When the electric field under a transmission line is sufficiently strong, it can be perceived by hair raising on an upraised hand. This is the effect of harmless levels of static electricity, similar to the effect of rubbing stocking feet on a carpet.

Other Health Concerns

An additional safety concern in the immediate vicinity of electric power lines is the potential for people to climb poles and either fall or receive a serious shock. Poles can be designed in a manner to prevent the unauthorized climbing of the poles by members of the public. With the increasing trend of large farm equipment, sufficient clearance height must be considered to avoid contact with the lines either directly or indirectly, as provided by the National Electric Safety Code.

Smoke can also be a conductor of electrical current. When a fire is in the vicinity of a 230-kV transmission line, the transmission line could start fires outside the fire perimeter. Current could potentially arc through the smoke shocking firefighters in the vicinity.

Corona Effects

Corona is the electrical breakdown of air into charged particles caused by the electrical field at the surface of conductors. Corona is of concern for potential audible noise (60-cycle hum), radio, television, and GPS interference, visible light, and photochemical reactions. Corona can occur on the conductors, insulators, and hardware of an energized high-voltage transmission line. Corona on conductors occurs at locations where the field has been enhanced by protrusions, such as nicks, insects, or drops of water. During fair weather, the number of these sources is small and the corona effect is insignificant. However, during wet weather, the number of these sources increases and corona effects are much greater (DOE 2001). Corona effects of concern are listed below.

- *Audible Noise* – Corona-generated audible noise from transmission lines is generally characterized as a cracking/hissing noise. The noise is most noticeable during wet weather conditions. Audible noise from transmission lines is often lost in the background noise at locations beyond the edge of the right of way. Refer to Section 3.12 for a description of existing noise in proposed project area.
- *Radio, Television, and GPS Interference* – Corona-generated radio interference is most likely to affect the amplitude modulation (AM) broadcast band (535 to 1,605 kilohertz); frequency modulation (FM) radio is rarely affected. GPS units are operated at frequencies of 1575.42 megahertz (MHz) and 1227.6 MHz (Enge and Hatch 1996) and no interference is expected with the 60 Hz frequency associated with transmission lines. Only AM receivers located very near to transmission lines have the potential to be affected by radio interference. The potential for interference from corona effects is more severe during damp or rainy weather.
- *Visible Light* – Corona may be visible at night as a bluish glow or as bluish plumes. On the transmission lines in the area, the corona levels are so low that the corona on the conductors usually is observable only under the darkest conditions with the aid of binoculars.
- *Photochemical Reactions* – When coronal discharge is present, the air surrounding the conductors is ionized and many chemical reactions take place producing small amounts of ozone and other oxidants. Approximately 90 percent of the oxidants is ozone, while the remaining 10 percent is composed principally of nitrogen oxides. Refer to Section 3.11 for a description of existing air quality.

3.4.3 Environmental Impacts

This section discusses the potential human health and environment effects of the proposed project. Potential impacts on human hearing are addressed in Section 3.12, Noise.

3.4.3.1 Alternative 1 – No Action

Under the No Action alternative, MATL would not build the proposed transmission line and associated facilities as proposed. There would be no EMF exposure associated with the project. EMF exposure from existing transmission lines and household appliances would be expected to continue. There would be no corona effects associated with the project. There would be no associated safety issues regarding co-location with a natural gas or oil pipeline.

3.4.3.2 Alternative 2 – Proposed Project

Electric and Magnetic Field Effects. Alternative 2 would use single-circuit, H-frame structures, with two overhead shield wires. Three-pole structures would be used at medium and heavy angles, and dead ends, strung with 230-kV conductors. The spacing of the structures would be in the range of 500 to 1,600 feet apart and the conductors would be 21 feet above the ground. The minimum ground clearance of the conductors set forth in the National Electric Safety Code is 19.72 feet; therefore some additional ground clearance would help diminish the potential for induced current exposure.

Table 3.4–3 lists the EMF strength under normal anticipated load conditions for the 230-kV single-circuit transmission line using H-frame structures. For comparison, the EMF field strengths are also provided for monopole structures. There is a maximum thermal capacity of 420 megavolt amperes. EMF strength is given for normal operating configurations that would be used by MATL. The electric field strengths and magnetic field strengths under normal operating conditions optimized phasing for transmission lines (H-frame structures) are shown in **Figure 3.4-2** and **Figure 3.4-3**, respectively (SNC-LAVALIN 2006). The distances given represent the distance of a receptor from the centerline of the transmission line and one meter above the ground. At a given distance, the electric and magnetic field strength would be nearly identical on both sides of the transmission line.

TABLE 3.4-3
EMF EFFECTS

Structure Type	Location	Distance from Center Line (feet)	Electric Field (KV/m)	Magnetic Field (mG)
H-frame NESC Ground Clearance: 19.72 ft.	Below Conductor	20	5.7	262
	Right of Way Edge	52.5	1.7	62
	Alignment Edge	250	0.01	3.8
Monopole NESC Ground Clearance: 19.72 ft.	Below Conductor	10	5.0	175
	Right of Way Edge	52.5	0.8	37
	Alignment Edge	250	<0.01	<3.8

Note: Estimates calculated using Corona and Field Effects Program (Kingery 1991), and based on conductor ground clearance of 19.72 feet (NESC specification).
kV/m = kilovolts per meter
mG = milligauss

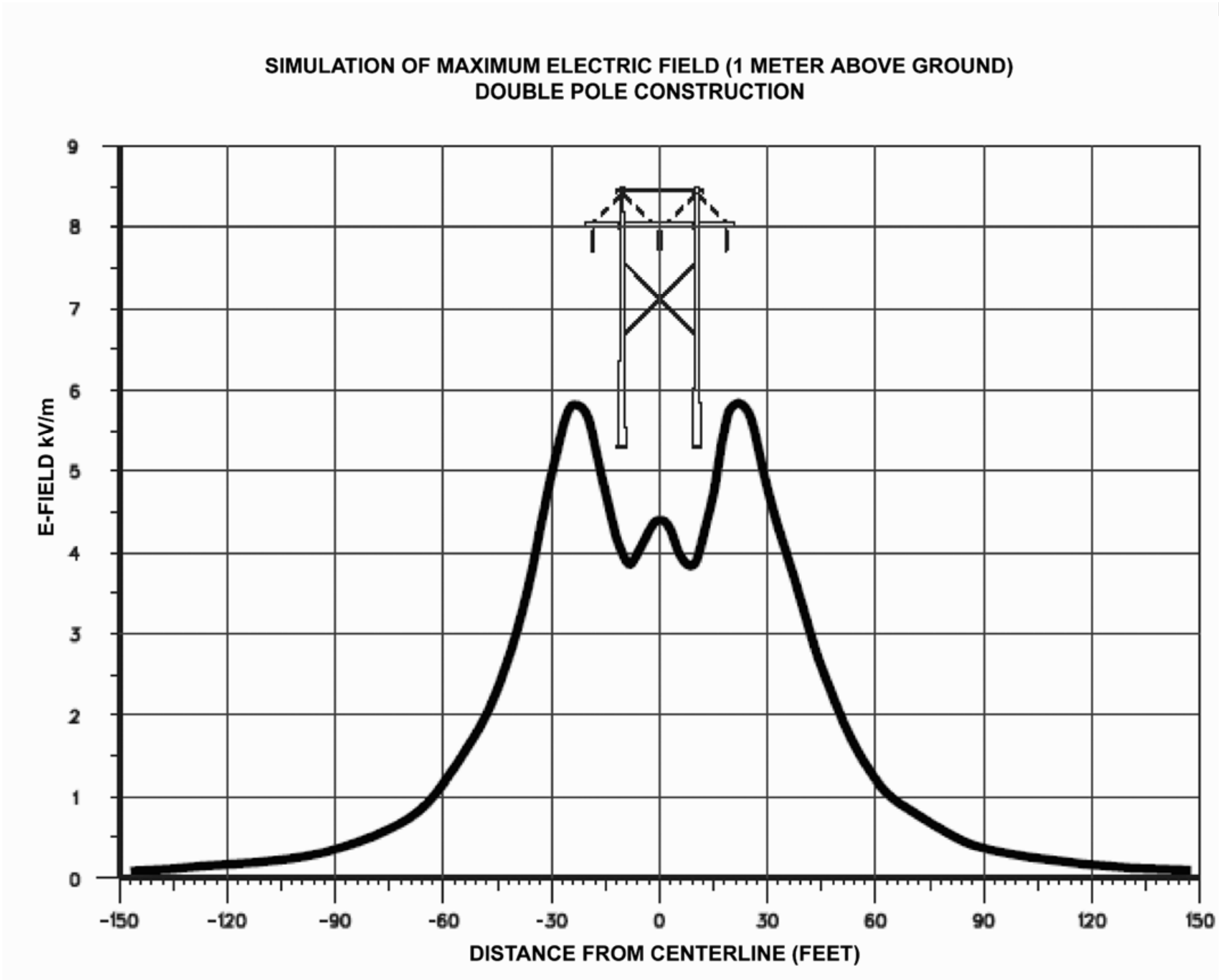


FIGURE 3.4-2
PROPOSED MATL POWERLINE
ELECTRIC FIELD STRENGTH FOR
NORMAL OPERATING CONDITIONS,
OPTIMIZED PHASING

E-Field - Electric Field
kV/m - Kilovolts per Meter

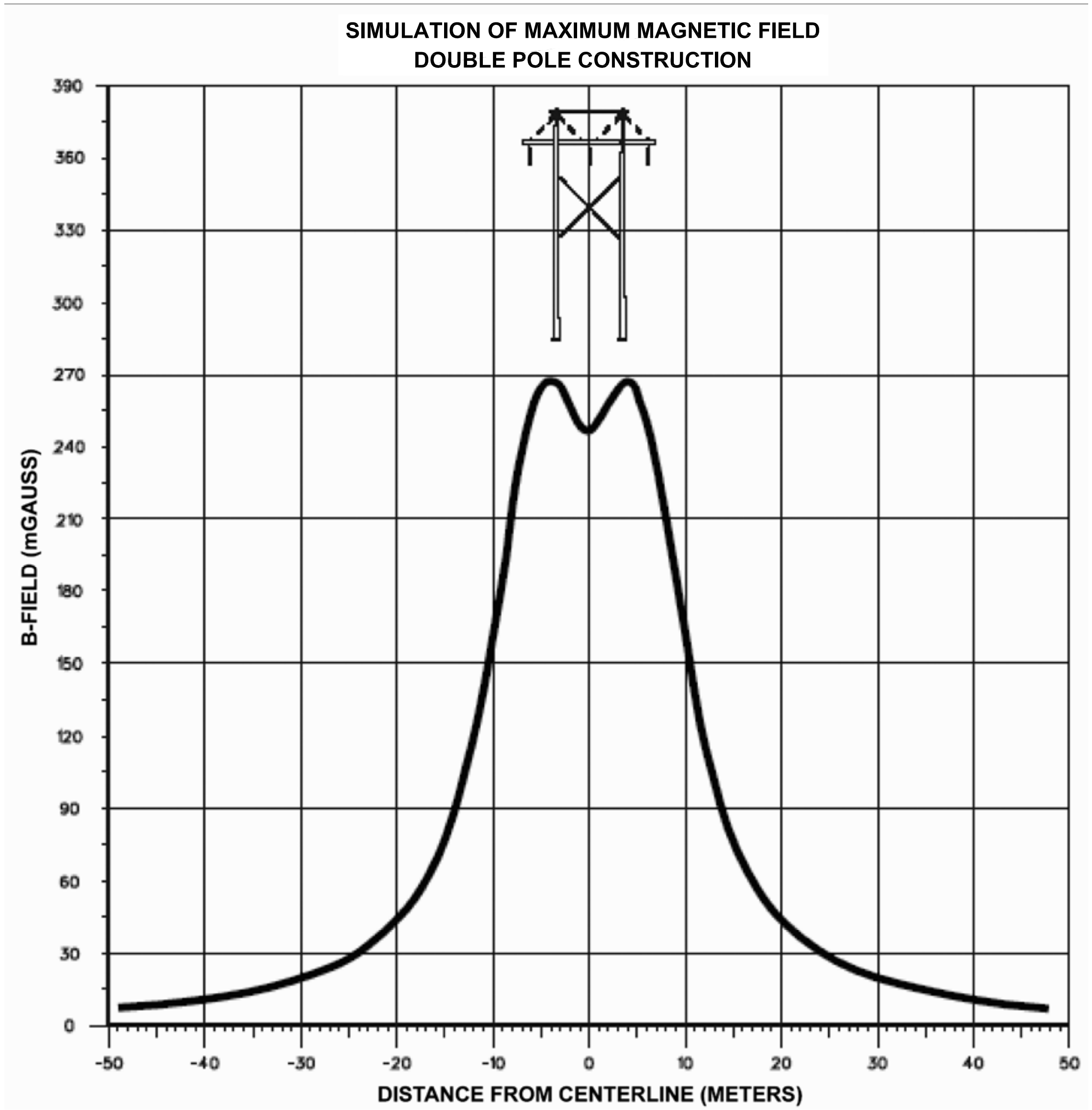


FIGURE 3.4-3
PROPOSED MATL POWERLINE MAGNETIC FIELD STRENGTH FOR NORMAL OPERATING CONDITIONS, OPTIMIZED PHASING

B-Field - Magnetic Field
mGAUSS - Milligauss

EMF effects are presented in **Table 3.4–3.** Two shield wires, which provide necessary shielding for lightning protection, would be placed near the top of each pole to shield the 230-kV phase subconductors. Each circuit of a single-circuit transmission line consists of three phases; each phase consists of two subconductors.

Long-term electric field exposure at the nearest residences to Alternative 2 (located within 300 feet of the line) would be below the state of Montana 1 kV/m standard at the edge of the right of way and the 0.8 mG of average daily exposure to maximum magnetic fields from some common household appliances (NIEHS 1999). The EMF strengths conform to those normally found in comparable lines. Schools and commercial establishments would be located farther from the transmission line. The closest schools to the transmission line would be Glacier Elementary at 0.86 mile to the west of Alternative 2, and Conrad Christian School at 0.4 mile to the northeast of Alternative 3.

Safety. As described in Section 3.4.2, the electric field created by a high-voltage transmission line extends from the energized conductors to other conducting objects such as the ground, towers, vegetation, buildings, vehicles, and people. Potential field effects can include induced currents, steady-state current shocks, spark discharge shocks, field perception and neurobehavioral responses and smoke and fire. The following describes the potential for effects on safety, and design mitigation measures that would be incorporated.

Induced Currents. The 230-kV transmission line would have a minimum ground clearance of 21 feet to reduce the potential for induced current shocks. In addition, permanent structures in the safety zone, such as fences, gates, and metal buildings would be grounded.

Steady-State Current Shocks. Features reducing the level of potential for induced current in objects near the transmission line also reduce the level of a possible induced current shock. The proposed lines would be constructed in accordance with industry and MATL standards to minimize hazardous shocks from direct or indirect human contact with an overhead, energized line. These lines are expected to pose minimal hazards to humans.

Spark Discharge Shocks. In accordance with MATL's transmission line standards, the magnitude of the electric field would be low enough that spark discharge shocks would occur rarely, if at all. The potential for nuisance shocks would be minimized through standard grounding procedures. Carrying or handling conducting objects, such as irrigation pipe, under transmission lines can result in spark discharges that are a nuisance. The primary hazard with irrigation pipes or any other long objects, however, is electrical flashover from the conductors if the section of pipe is inadvertently tipped up near the conductors. In order to minimize these effects, the transmission lines would be constructed with adequate ground clearance and any pipelines would be properly grounded. The use of farm augers under power lines should be conducted using the guidelines presented by the Occupational Health and Safety Administration (OSHA). As a general rule, when handling farm equipment of any type around power lines, one should stay 10 feet away on all sides (360 degrees).

Field Perception and Neurobehavioral Responses. Perception of the field associated with the transmission lines would not be felt beyond the edge of the safety zone. Persons working in the right of way might feel the field. Studies of short-term exposure to electric fields have shown that fields may be perceived (for example, felt as movement of arm hair) by some people at levels of about 2 to 10 kV/m, but studies of controlled, short-term exposures to even higher levels in laboratory studies have shown no adverse effects on normal physiology, mood, or ability to perform tasks (DOE 2001a). The International Commission on Non-Ionizing Radiation Protection Guidelines recommend that short-term exposures be limited to 4.2 kV/m for the general public. The exposures associated with the proposed Project are below this recommended limit, reaching a maximum of less than 1.5 kV/m within the safety zone (International Commission on Non-Ionizing Radiation Protection 2003).

The monopole steel structures that would be used are non-climbable. The ground clearance of the conductors would be a minimum of 21 feet, adequate clearance for safety considerations as related to most recreational activities.

Smoke and Fire. When a fire is in the vicinity of a 230-kV transmission line, firefighters would monitor smoke near the transmission line for possible fire starts outside of the fire perimeter. Firefighters would remain at a distance that would not leave them vulnerable to the electric current or shock.

Corona Effects. Corona is the electrical breakdown of air into charged particles caused by the electrical field at the surface of conductors. As described in Section 3.4.2, corona is of concern for potential audible noise, radio, television, and GPS interference, visible light, and photochemical reactions.

Audible Noise. Noise levels generated by the transmission lines would be greatest during damp or rainy weather. For the proposed lines, low-corona design established through industry research and experience would minimize the potential for corona-related audible noise. The proposed lines would not add substantially to existing background noise levels in the area. Research by the Electric Power Research Institute (1982) has validated this by showing the fair-weather audible noise from modern transmission lines to be generally indistinguishable from background noise at the edge of a 100-foot safety zone. During rainy or damp weather, an increase in corona-generated audible noise would be balanced by an increase in weather-generated noise.

For additional assessment of the noise from the proposed Project and alternatives, refer to Section 3.12.

Radio, Television, GPS Interference. Transmission line-related radio-frequency interference is one of the indirect effects of line operation produced by the physical interactions of transmission line electric fields. The level of such interference usually depends on the magnitude of the electric fields involved. The line would be constructed according to industry standards, which minimize the potential for surface irregularities (such as nicks and scrapes on the conductor surface), sharp edges on suspension hardware and other irregularities around the conductor surface that would increase corona effects. However, if such corona interference were to be generated, no interference-related complaints would be expected given the distance of residents from the transmission lines. Federal Communications Commission regulations require each project owner to ensure mitigation of any such interference to the satisfaction of the affected individual. Typical mitigation measures include: cleaning insulators, tightening line hardware, inspecting conductor surface for irregularities, relocating antennas, installing high-gain or directional antennas, connecting to a cable system or installing a translator station.

Power lines can affect the radio frequency of each GPS receiver. Manufacturers have different methods of shielding GPS signals; therefore, each receiver will react differently in the environment surrounding power lines. Damaged power lines may cause interference with GPS signals.

Visible Light. The corona levels associated with the proposed transmission lines would be similar to those of existing transmission lines. The visible corona on the conductors would be observable only under the darkest conditions with the aid of binoculars.

Photochemical Reactions. The maximum incremental ozone levels at ground level produced by corona activity on the proposed transmission lines would be similar to those produced by the existing lines in the area. During damp or rainy weather the ozone produced would be less than 1 part per billion. This level is low when compared to natural levels and their fluctuations (DOE 2001a).

Corona would be mitigated by using proper line design and by incorporating line hardware shielding. The design of electrical hardware and equipment considers the potential for corona effects.

Safety of Co-locating a Transmission Line and a Pipeline. There are a number of potential safety issues associated with constructing a transmission line near a buried natural gas or crude oil pipeline, related to electrical shock hazard and natural gas pipeline leaks and fire or explosion hazards should a natural gas leak occur.

A buried pipeline that shares an alignment with an alternating current transmission line, such as the one proposed for the project, could become energized by the EMF surrounding the power system in the air and soil. This alternate current interference may result in an electrical shock hazard for people touching the pipeline or metallic structures connected to the pipeline, and may cause damage to the pipeline coating, insulating flanges, or even damage to the pipeline's wall itself (Dawalibi 2004). However, the natural gas or oil pipelines would not carry electricity or otherwise present a shock hazard to residential gas users.

The transmission line would cross over several pipelines. Therefore, where feasible, a minimum distance of 132 feet from any above ground structures such as wellheads, would be maintained between the proposed transmission line and the edge of an existing pipeline right of way or the pipe itself. Additional mitigation measures include grounding mats, gradient wire controls, gradient control mats or grids and/or the installation of a cathodic protection system to the pipelines to minimize shock hazard and damage to the pipelines. MATL would consult with pipeline owners about the proposed project and once an exact location for the structures is determined, MATL would implement the appropriate mitigation measure. In addition, the transmission line would comply with all Federal and State regulations concerning co-locating a transmission line near a buried gas pipeline (Dawalibi 2004).

There are potential safety issues associated with construction and maintenance vehicles driving over any gas or oil pipelines. MATL would consult with any pipeline owner after final siting of the transmission line structures regarding this issue.

3.4.3.3 Alternatives 3 and 4 – MATL B and Agency Alternative

Alternatives 3 and 4 would also involve the construction of 230-kV single-circuit transmission lines. **Table 3.4-3** lists the EMF strength under normal anticipated load conditions for the 230-kV single-circuit transmission lines. **Figures 3.4-2** and **3.4-3** graphically illustrate the electric and magnetic field strengths, respectively, for the optimized phasing configuration of the transmission lines. The distances given represent the distance of a receptor from the centerline of the transmission line. At a given distance, the EMF strength would be nearly identical on both sides of the transmission line safety zone. Impacts described in Alternative 2 would be the same under Alternatives 3 and 4.

3.5 Water Resources

3.5.1 Analysis Methods

Surface water resources in the study area were evaluated using a GIS analysis for each alternative to identify locations where an alignment could cross a water body. For this evaluation it was assumed that:

- Disturbance for each alternative alignment could be within 250 feet to either side of the reference centerline.
- The probability for temporarily increasing sources of sediment to surface water is proportional to the number of water body crossings.

In addition, none of the action alternatives propose any beneficial use of groundwater. Furthermore, no project element has been identified that could possibly affect groundwater quality. Therefore, groundwater resources are not considered for impact analysis.

Information Sources

Data on water resources in the analysis area were obtained from a variety of sources including literature review, reports from the Montana Natural Heritage Program (NHP), the DEQ 2006 Integrated 303(d)/305(b) Water Quality Report, Federal Emergency Management Agency (FEMA), Flood Insurance Rate Maps, the Montana NRIS, and the MFSA application (MATL 2006b). Surface water flow and quality information were obtained from the USGS, the MBMG, and DEQ. To the degree possible, information was verified by ground reconnaissance during a team field trip May 17-18, 2006.

Analysis Area

The water resources analysis area is the same as the study area and encompasses about 2,260 square miles in northcentral Montana from the Montana-Alberta border to the Great Falls area (**Figure 1.1-1)**. This region includes portions of eight hydrologic subbasins in Montana, all of which contribute to the lower Missouri River Basin (**Figure 3.5-1)**.

The primary surface water features in the analysis area are Cut Bank Creek, the Marias River and the Dry Fork Marias River, Pondera Coulee, the Teton River, Benton Lake, Hay Lake, and the Missouri River. Isolated prairie potholes, lakes, and stock reservoirs are scattered throughout the analysis area.

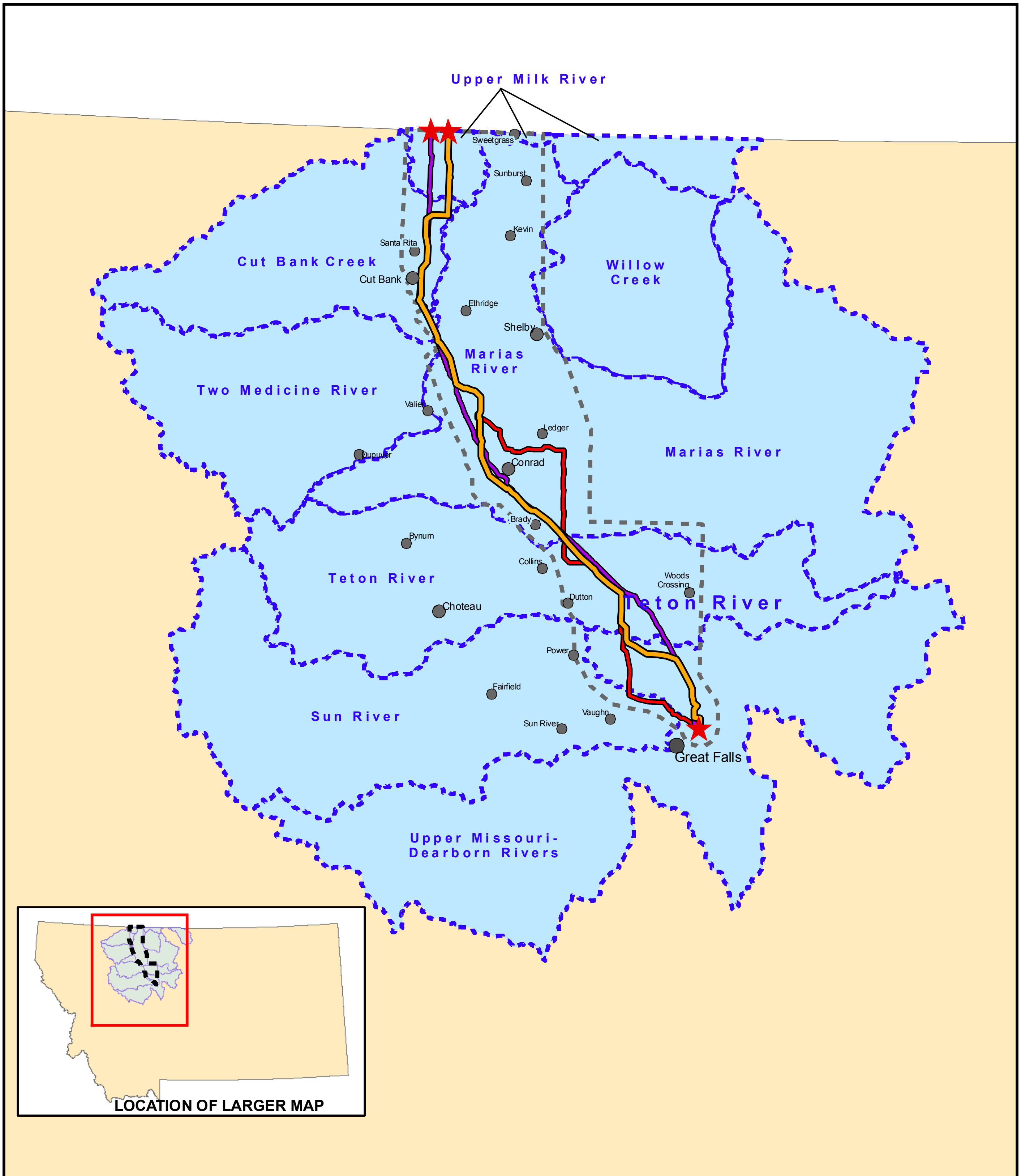


FIGURE 3.5-1
WATERSHEDS INTERSECTING THE STUDY AREA

LEGEND

- MAJOR WATERSHEDS
- CITIES AND TOWNS
- ALIGNMENT END AND EXIT POINTS
- STUDY AREA BOUNDARY
- ALT2 - ALIGNMENT
- ALT3 - ALIGNMENT
- ALT4 - ALIGNMENT

NOTE:
ALT = ALTERNATIVE

GIS map by Ed Madej -TTEMI-HE Fig3_5-1_MATL_Water_Study_Area_letter_012207.mxd

3.5.2 Affected Environment

The water resources analysis area is generally one of low topographic relief, low precipitation, and agricultural vegetation types. Elevations range from 4,372 feet above sea level in the northwest corner of the analysis area to about 3,016 feet above sea level on the Missouri River in the southeast corner of the analysis area.

Precipitation and Recharge

The region is semi-arid and precipitation patterns do not vary widely throughout the analysis area. Average annual precipitation varies from 11.6 inches per year near Cut Bank to 15.2 inches per year near Great Falls (Western Regional Climate Center [WRCC] 2006). Winters can be extremely cold with desiccating winds and snow. May and June are the wettest months; however, perennial streams and rivers are sustained primarily from moisture derived from mountain snowpack.

Activities that Affect Resource Conditions

Water resources of the analysis area, including both surface water and groundwater, are affected directly or indirectly by human activities such as irrigation, livestock use, industry, oil and gas development, domestic consumption, and to a lesser extent by recreation and transportation. These interdependencies can affect human health, wildlife, engineered structures, and economics of the region. The primary beneficial uses of water in the analysis area include agriculture, support of domestic activities, and fish and aquatic life.

Water Quality

No specific areas of water quality problems have been recorded for water in the analysis area other than impaired water bodies identified by DEQ. The U.S. Clean Water Act Section 303(d) requires that each state submit a biennial report to the EPA that identifies water bodies that are water quality limited. The resulting 303(d) list provides the basis for systematically tracking state waters that do not meet water quality standards. Streams and rivers designated as 303(d) or impaired streams in the analysis area are: Old Maids Coulee (an intermittent stream), Pondera Coulee, Cut Bank Creek, Marias River, Teton River, Lake Creek, and the Missouri River. The 303(d) streams are shown on **Figure 3.5-2.** The Marias River is expected to be delisted in early 2007, and Benton Lake is listed as “impaired.” Summary sheets describing the impaired river segments, the type of impairment, and the cause of the impairment are provided in **Appendix I**.

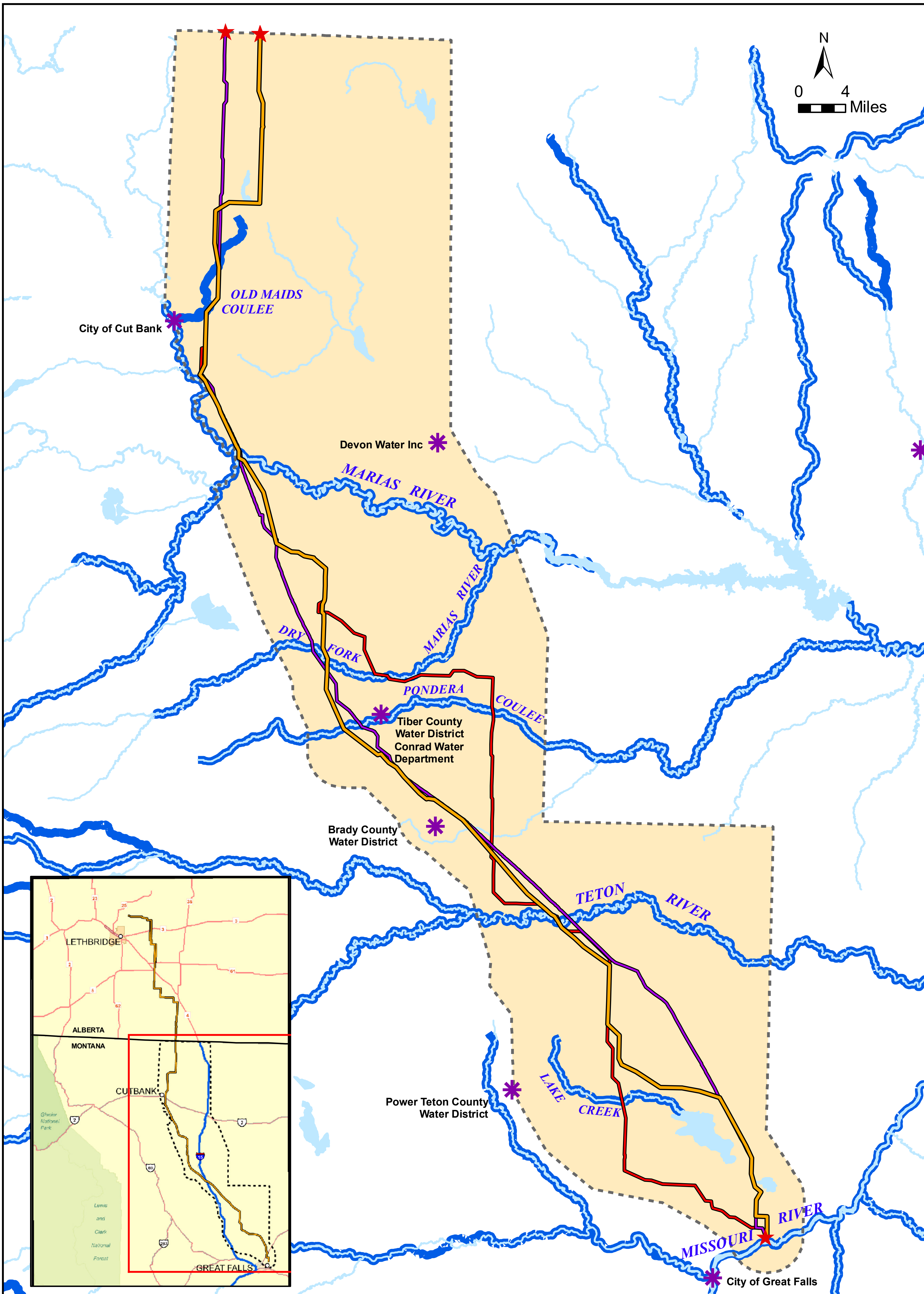


FIGURE 3.5-2
HYDROLOGIC FEATURES AND WATER QUALITY

LEGEND

- MUNICIPAL POTABLE WATER SOURCE (DEQ)
- RIVERS AND STREAMS
- IMPAIRED 303(d) STREAMS
- LAKES AND PONDS
- CITIES AND TOWNS
- ALIGNMENT END AND EXIT POINTS
- STUDY AREA
- ALT2 - ALIGNMENT
- ALT3 - ALIGNMENT
- ALT4 - ALIGNMENT

NOTE:
ALT = ALTERNATIVE

GIS map by Ed Madej -TTEMI-HE Fig3_5-2_MATL_Water_Quality_012207.mxd

Water Rights

Existing water rights would not be affected by the proposed Project.

Surface Water

The analysis area is located within the Missouri-Marias watershed subregion in west central Montana. Portions of the analysis area fall within one or more of the following 4th level hydrologic unit codes (HUC): Upper Milk River, Cut Bank Creek, Marias River, Two Medicine River, Willow Creek, Teton River, Sun River and Upper Missouri-Dearborn rivers (USGS 2006a). Surface water flow data presented herein were retrieved from the USGS website (USGS 2006c).

One water body within the analysis area has been identified by the FWP as a blue ribbon or red ribbon fishery river depending on the stream reach (Missouri River). The locations at which all three alternatives cross the Marias and Teton rivers are considered habitat class 3 and sport class 4 fisheries. Some streams in the analysis area are perennial (typically have surface flow throughout the year). These streams are shown on **Figure 3.5-2**. However, most other streams in the analysis area are either ephemeral (flow only in response to snowmelt or rainfall) or intermittent (flow only in response to groundwater recharge and precipitation). Numerous intermittent streams, lakes, reservoirs, and prairie potholes are also present within the analysis area.

A summary of surface water resources and water quality in the analysis area organized by HUC is provided in **Appendix J**. Surface water quality is also summarized on **Figure 3.5-2**.

Lakes and Reservoirs

The analysis area contains a number of lakes and reservoirs; however, there are some portions of the analysis area that are nearly devoid of lakes, such as the area between Benton Lake and the Teton River.

All surface water bodies with areas at least 5 acres in size and crossed by an alternative alignment are presented on **Figure 3.5-2.** The largest of these water bodies is Benton Lake, which is located in the southeastern portion of the analysis area. Benton Lake is a glacially formed 5,000-acre shallow wetland. Other large lakes include Aloe Lake and Hay Lake, both of which are located north of the Marias River. Numerous smaller lakes are found throughout the area. **Appendix J** lists the lakes in the analysis area that are at least 20 acres in size and all lakes greater than 5 acres that are crossed by one of the action alternatives.

Municipal Water in the Analysis Area

Most of the municipal watersheds serve as groundwater sources for one or more communities, while a smaller number serve as surface water sources. Municipal watersheds with potable surface water bodies include the Cut Bank Watershed (Cut Bank Creek) and the Marias Watershed.

There are six water districts within the analysis area that rely on surface water for potable water. These include Cut Bank, Devon Water, Inc., Tiber County Water District (Conrad Water Department), Brady County Water District, Power Teton County Water District, and the City of Great Falls.

3.5.3 Environmental Impacts

Water resources and associated infrastructure that potentially could be affected by the proposed project include perennial streams and rivers, ephemeral and intermittent drainages, floodplains, irrigation ditches and canals. Temporary impacts to water are categorized as lasting less than 30 days, short-term impacts are less than 1 year, and long-term impacts are greater than 1 year. Adverse impacts to water (if they occur) would be considered major if they meet one or more of the following criteria:

- If the expected water use would exceed the capacity of the potable water system for a community or individual.
- If the quantities of stream flow affecting downstream beneficial uses would be altered.
- If groundwater withdrawals would affect either the quantity or quality of existing water supply wells within a 1-mile radius of the proposed withdrawal location.
- If stream bank disturbance would result in pronounced sedimentation or if disturbance would cause streambed erosion or sedimentation.
- If wastewater discharge would result in erosion contributing to sedimentation in surface water.
- If an alternative would result in a reduction in the quantity or quality of water resources to below Montana water quality standards or in violation of a TMDL plan for existing or potential future uses.
- If the proposed Project or alternatives would cause substantial flooding or erosion, or subject people or property to flooding or erosion.

All project alternatives were evaluated to identify adverse impacts to water resources using the above criteria. No major impacts to water resources are predicted for any of the action alternatives. The only minor issue is the potential for soil erosion that could contribute to higher levels of suspended sediment at water body crossings. A comparison of alternatives showing the number of crossings is provided in **Table 3.5-1**.

Figure 3.5-2 shows the locations of crossings for each alternative. The suspended sediment issue is further discussed below.

TABLE 3.5-1 HYDROLOGY – COMPARISON OF ALTERNATIVES					
Alternative	**Linear Miles**	**Mileage Difference Compared to Alternative 2**	**Stream or River Crossings[a]**	**Lake Crossings[a]**	**Total Crossings[a]**
1	0	Not Applicable	0	0	0
2	129.9	Not Applicable	10	4	14
3	121.6	8 miles shorter	6	6	12
4	139.6	10 miles longer	17	2	19

Note: [a] A crossing is assumed if a water body is within 250 feet of the reference centerline, the width of the alignment that DEQ would approve. Actual disturbance from construction would typically be less than 100 feet wide as indicated in **Table 2.3-2**.

3.5.3.1 Alternative 1 — No Action

Under the No Action alternative, the existing water use and land use activities near surface water would continue. Activities described under the action alternatives would not take place. There would not be an alteration to area water resources due to transmission line installation and maintenance; therefore, no impacts to water resources would occur.

3.5.3.2 Alternative 2— Proposed Project

Impacts to Surface Water and Floodplains

Despite implementation of a storm water control plan, Alternative 2 would likely result in minor, short-term, adverse impacts to surface water quality by temporarily increasing sources of sediment during the construction phase of the proposed project. Stream crossing construction activities (such as pole placement, road construction, and staging areas for construction) could potentially take place in either a localized area, or parallel and adjacent to a stream. Construction activities in flowing or standing water would result in the greatest impact, and would be avoided. Minor short-term sediment impacts would continue until reclamation was complete and the surface was revegetated. Minor long-term adverse impacts to surface water quality could occur if temporary roads near water crossings were constructed and remained in use after project construction activities were complete.

The Alternative 2 alignment would cross a body of water up to 14 times, including eight perennial streams (Teton River, Pondera Coulee, Spring Coulee, Dry Fork Marias, Schultz Coulee, Bullhead Creek, Marias River, and Red River [three crossings]; and four lakes ranging in size from 7 acres to 121 acres (Black Horse Lake [west finger], an unnamed lake in the Marias River Basin, Hay Lake, and Grassy Lake).

Alternative 2 includes measures to mitigate or prevent adverse impacts to surface water. Pole structures would not be installed below the normal high-water mark. MATL proposes to prepare and implement a Storm Water Erosion Control Plan and comply with all requisite permit conditions. These measures would effectively reduce short-term and long-term risk of sedimentation to surface water to minor adverse impacts.

3.5.3.3 Alternatives 3 and 4

Alternative 3

Adverse, short-term impacts for Alternative 3 are similar to, but slightly less than Alternative 2. Overall, there is less potential to generate suspended sediment for Alternative 3.

The Alternative 3 alignment would cross a body of water only 12 times, including six perennial streams (Teton River, Pondera Coulee, Spring Coulee, Dry Fork Marias, Bullhead Creek, and Marias River) and six lakes ranging in size from 8 acres to 116 acres (Black Horse Lake [west finger], an unnamed lake in the Missouri Sun-Smith Basin, two unnamed lakes in the Marias River basin, and two unnamed lakes in the Upper Milk River Basin).

Alternative 4

Adverse, short-term impacts for Alternative 4 are similar to, but slightly more than Alternative 2 and Alternative 3. Overall, there is more potential to generate suspended sediment for Alternative 4.

The Alternative 4 alignment would cross a body of water up to 19 times, including six perennial streams (Lake Creek, Pondera Coulee, Spring Coulee, Dry Fork Marias, Schultz Coulee [two crossings], Bullhead Creek, the Marias River, and Red River [three crossings]; and two lakes ranging in size from 115 acres to 160 acres (Hay Lake and Grassy Lake).

3.6 Wetlands

3.6.1 Analysis Methods

Wetlands are lands transitional between terrestrial and aquatic systems and are among the most biologically productive ecosystems in the world. Wetlands are defined as areas that are inundated or saturated by surface or groundwater at frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, fens, marshes, bogs, and similar areas (COE 1987).

Wetlands are of critical importance to the protection and maintenance of a large array of plants and animals, including threatened and endangered species, by providing essential seasonal habitats. Wetlands help protect the quality of surface water by impeding the erosive forces of moving water and trapping waterborne sediment and associated pollutants, protecting water supplies by assisting the purification of surface water and groundwater resources, maintaining base flow to surface waters through the gradual release of stored floodwaters and groundwater, and providing a natural means of flood control and storm damage protection through the absorption and storage of water during high-runoff periods.

Activities that involve a disturbance or backfilling of material in a wetland are typically regulated by local, state, and federal government agencies through the authorities granted by Sections 401 and 404 of the U.S. Clean Water Act. Section 401 of the Clean Water Act provides the means for Montana local and state agencies to regulate and control the degree of impact of discharges on state waters, including wetlands. Montana's primary water quality protection is granted through the implementation of the Montana Water Quality Act. Section 404 of the Clean Water Act provides protection for wetlands that (1) meet three criteria (wetland hydrology, hydric soils, and hydrophytic vegetation) as defined in the Wetlands Delineation Manual (COE 1987), and (2) are connected through an inflow or outflow to a defined surface water drainage. Isolated wetlands, such as a prairie pothole or small ponds, are no longer protected by Section 404 of the Clean Water Act (COE 2001). However, any discharge of pollutants to isolated wetlands that contain water is still subject to provisions of the Montana Water Quality Act.

Analysis Area

The analysis area for the wetland resources includes all wetlands (jurisdictional or non-jurisdictional) within the Project study area (**Figure 1.1-1**). Most of the wetlands have been identified, classified, and digitized, and the data are available to download from the FWS website. The analysis addresses the proposed and alternative transmission line alignments in greater detail.

Information Sources

Wetlands within the Project study area are available from a FWS website (FWS 2006) on a format known as National Wetland Inventory (NWI) maps. However, there are no wetland data available for portions in Teton County from approximately the town of Brady south to just north of Benton Lake NWR. Other sources of data, including USGS 7.5-minute topographic maps, FEMA maps, and the 2005 orthophotographs (Montana NRIS 2006a), were used for the Teton County area to determine potential wetlands along the proposed and alternative alignments. In addition, the data provided in the MFSA application (MATL 2006b) were reviewed and field investigations were conducted in July and August 2005 to ground-truth mapped wetlands and identify previously unmapped wetlands.

3.6.2 Affected Environment

The system used to classify the wetland types is based on the classification system developed by Cowardin and others (1979). Three basic types of wetlands, lacustrine (lakes); palustrine (ponds); and riverine (rivers and streams), were identified within the analysis area. Within these three types were 14 individual wetland classes (**Table 3.6-1**). The lacustrine wetlands include intermittent and permanently flooded lakes and reservoirs. The palustrine group includes all wetlands dominated by trees, shrubs, emergents, mosses, or lichens. Two main riverine wetlands (lower perennial and upper perennial) were identified within the analysis area and they typically contain natural or artificial channels that have either periodically or continuously flowing water.

TABLE 3.6-1
WETLAND TYPES MAPPED IN ANALYSIS AREA

No.	Wetland Types	Wetland Class	Wetland Code
1	Lacustrine/Limnetic	Unconsolidated Bottom	L1UB
2	Lacustrine/Littoral	Aquatic Bed	L2AB
3	Lacustrine/Littoral	Unconsolidated Shore	L2US
4	Palustrine	Aquatic Bed	PAB
5	Palustrine	Emergent	PEM
6	Palustrine	Forested	PFO
7	Palustrine	Scrub-Shrub	PSS
8	Palustrine	Unconsolidated Bottom	PUB
9	Palustrine	Unconsolidated Shore	PUS
10	Riverine/Lower Perennial	Unconsolidated Bottom	R2UB
11	Riverine/Lower Perennial	Unconsolidated Shore	R2US
12	Riverine/Upper Perennial	Rock Bottom	R3RB
13	Riverine/Upper Perennial	Unconsolidated Bottom	R3UB
14	Riverine/Upper Perennial	Unconsolidated Shore	R3US

The following factors were considered when evaluating potential impacts to wetland and non-wetland waters of the U.S. resources from the transmission line alternatives:

- Net permanent loss of any wetland areas or functions,
- Net temporary loss of any wetland areas or functions,
- Effects on the condition and functional integrity of other wetlands that may be impacted but do not experience net loss,
- Potential for wetland filling from grading or construction activity or excavation and backfill,
- Potential for wetland flooding from construction activities, incorrect design or placement of culverts, or an increase in impervious areas adjoining wetlands that may raise water levels,
- Potential for wetland draining from grade changes that may divert surface flow that formerly fed wetlands in isolated depressions,
- Potential for wetland sedimentation resulting from surface soil disturbance adjacent to wetlands, and
- Wetland water quality degradation from contaminants in runoff.

Table 3.6-2 provides a percentage and area breakdown for all 14 wetland types that are sited in the analysis area. **Figures 3.6-1, 3.6-2, and 3.6-3** show the location of all mapped wetlands within the study area.

TABLE 3.6-2
PERCENTAGE AND AREA OF WETLAND TYPES IN ANALYSIS AREA

Wetland Type	Percent of Total Wetland Area	Area (acres)
Lacustrine/Limnetic – L1UB	1.2	401
Lacustrine/Littoral – L2AB	4.2	1,429
Lacustrine/Littoral – L2US	11.4	3,909
Palustrine – PAB	4.9	1,694
Palustrine – PEM	69.0	23,635
Palustrine – PFO	0.02	7
Palustrine – PSS	0.4	146
Palustrine – PUB	0.3	106
Palustrine – PUS	3.6	1,240
Riverine/Lower Perennial – R2UB	2.5	865
Riverine/Lower Perennial – R2US	1.1	379
Riverine/Upper Perennial – R3RB	0.02	5
Riverine/Upper Perennial – R3UB	1.0	346
Riverine/Upper Perennial – R3US	0.3	100
Totals	**100.0**	**34,262**

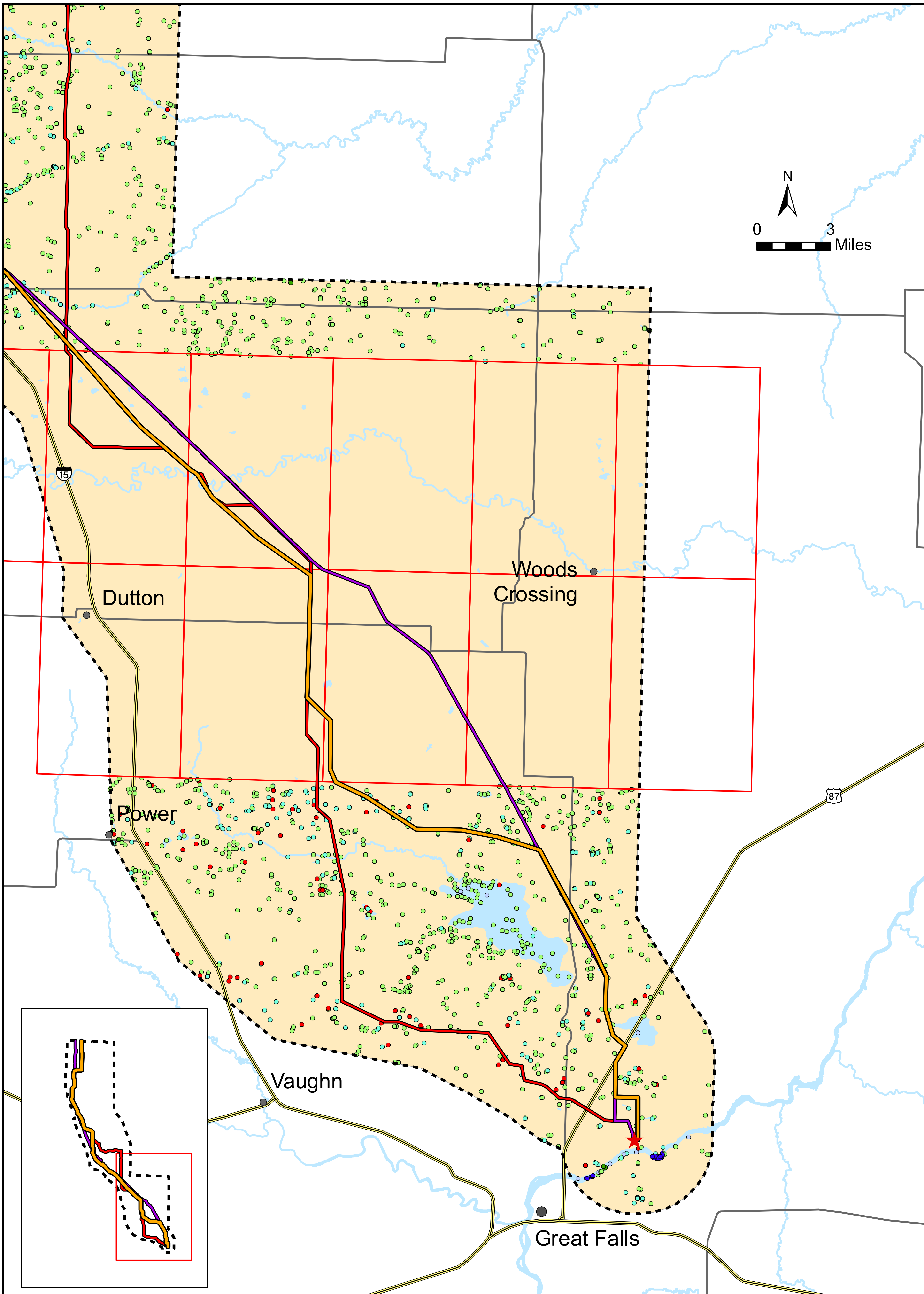


FIGURE 3.6-1
WETLANDS IN
STUDY AREA
SOUTH

LEGEND

WETLAND TYPE

- FRESHWATER EMERGENT WETLAND
- FRESHWATER FORESTED - SHRUB WETLAND
- FRESHWATER POND
- RIVERINE WETLAND
- OTHER WETLAND
- LAKE
- 24K TOPO MAPS WITH NO WETLANDS DATA

NOTE: WETLANDS DATA FROM NATIONAL WETLANDS INVENTORY, USFWS.

- ALT2 - ALIGNMENT
- ALT3 - ALIGNMENT
- ALT4 - ALIGNMENT

- RIVERS AND STREAMS
- CITIES AND TOWNS
- ALIGNMENT END AND EXIT POINTS
- STUDY AREA

NOTE:
ALT = ALTERNATIVE

GIS map by Ed Madej -TTEMI-HE Fig3_6-1_MATL_Wetlands_South_012007.mxd

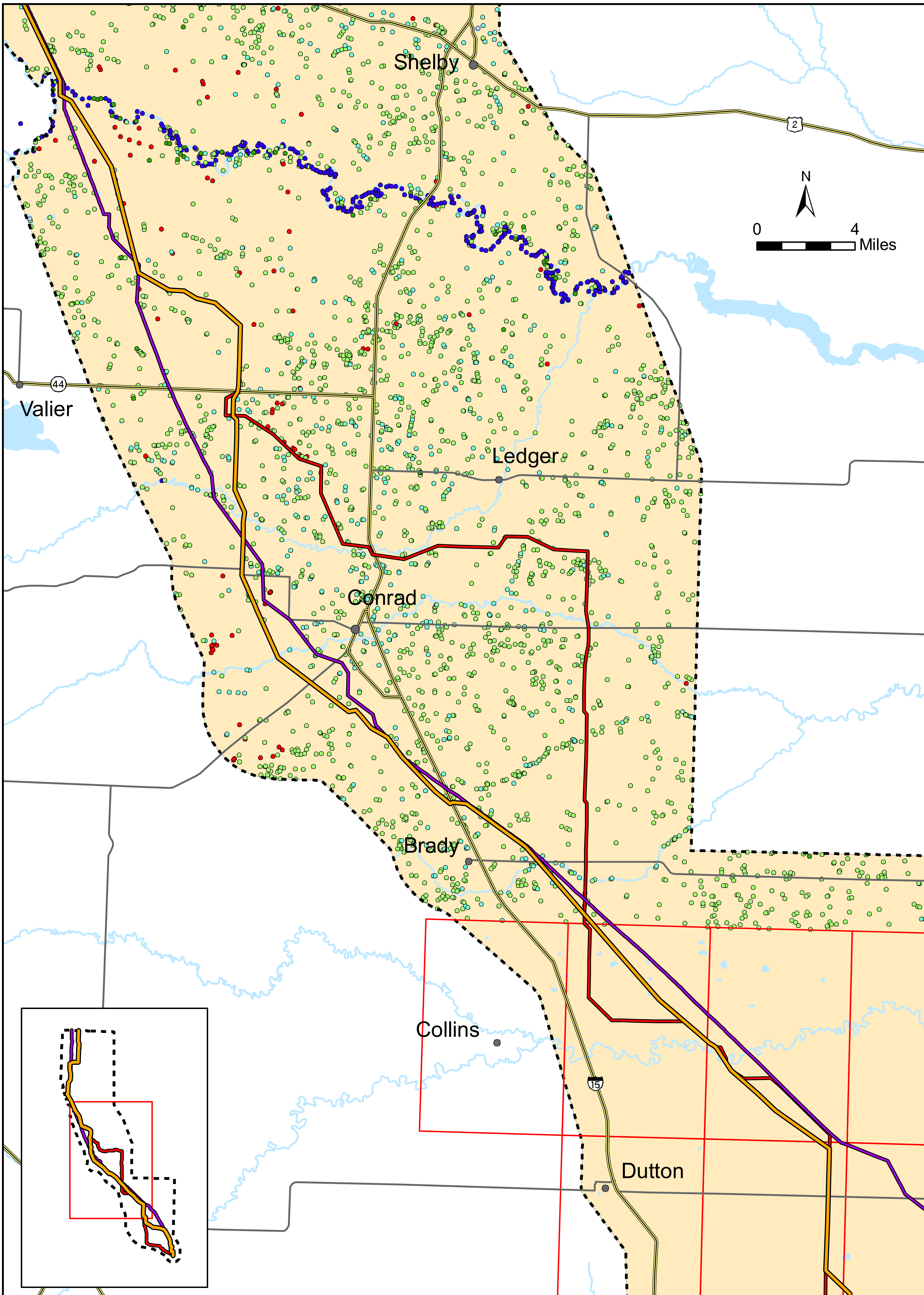


FIGURE 3.6-2
WETLANDS IN STUDY AREA MIDDLE

LEGEND

WETLAND TYPE
- FRESHWATER EMERGENT WETLAND
- FRESHWATER FORESTED - SHRUB WETLAND
- FRESHWATER POND
- RIVERINE WETLAND
- OTHER WETLAND
- LAKE
- 24K TOPO MAPS WITH NO WETLANDS DATA

NOTE: WETLANDS DATA FROM NATIONAL WETLANDS INVENTORY, USFWS.

- ALT2 - ALIGNMENT
- ALT3 - ALIGNMENT
- ALT4 - ALIGNMENT
- RIVERS AND STREAMS
- CITIES AND TOWNS
- ALIGNMENT END AND EXIT POINTS
- STUDY AREA

NOTE:
ALT = ALTERNATIVE

GIS map by Ed Madej -TTEMI-HE Fig3_6-2_MATL_Wetlands_middle_012007.mxd

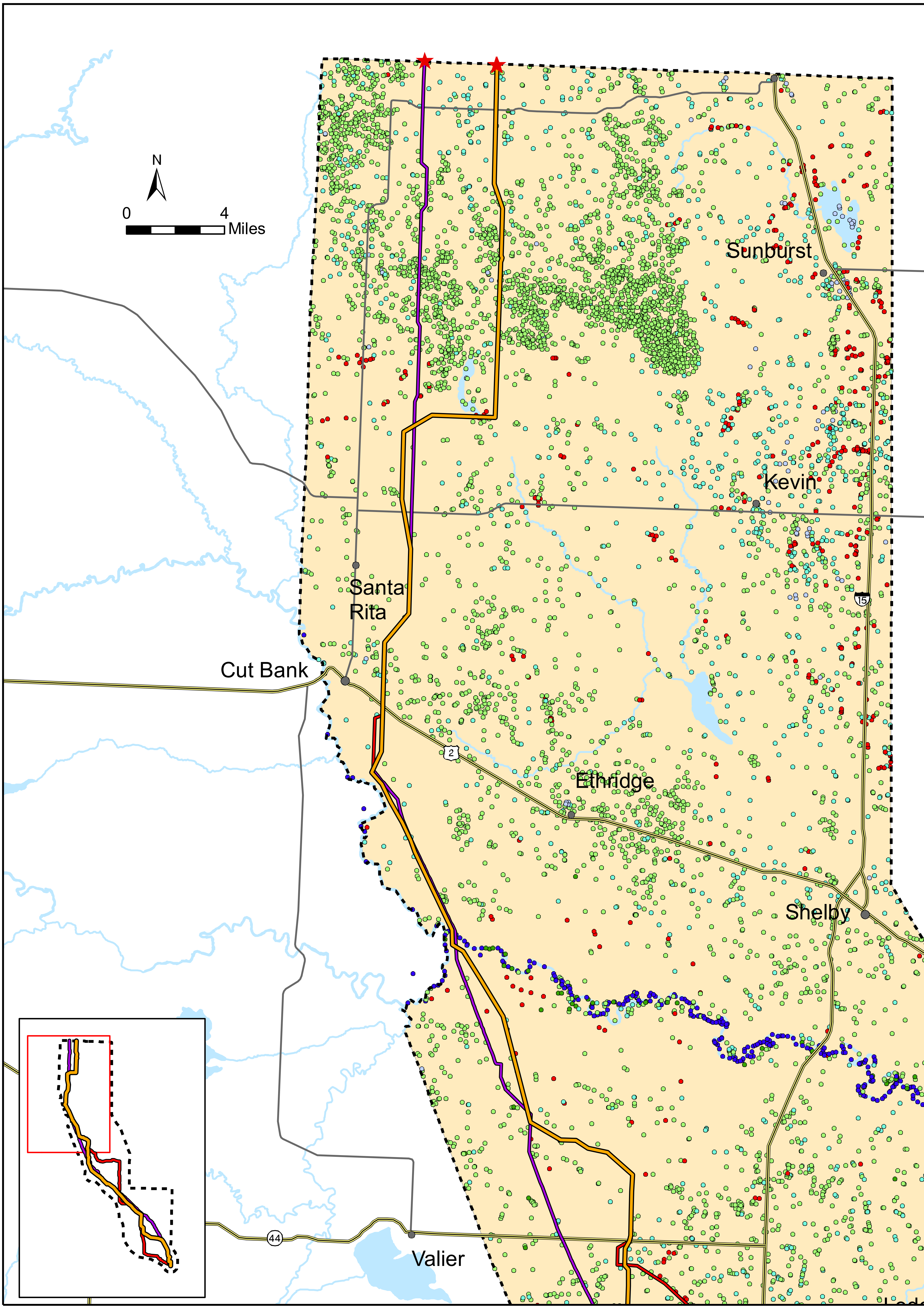


FIGURE 3.6-3
WETLANDS IN STUDY AREA NORTH

LEGEND

WETLAND TYPE
- FRESHWATER EMERGENT WETLAND
- FRESHWATER FORESTED - SHRUB WETLAND
- FRESHWATER POND
- RIVERINE WETLAND
- OTHER WETLAND
- LAKE
- 24K TOPO MAPS WITH NO WETLANDS DATA

NOTE: WETLANDS DATA FROM NATIONAL WETLANDS INVENTORY, USFWS.

- ALT2 - ALIGNMENT
- ALT3 - ALIGNMENT
- ALT4 - ALIGNMENT
- RIVERS AND STREAMS
- CITIES AND TOWNS
- ALIGNMENT END AND EXIT POINTS
- STUDY AREA

NOTE:
ALT = ALTERNATIVE

GIS map by Ed Madej -TTEMI-HE Fig3_6-3_MATL_Wetlands_North_012007.mxd

Palustrine wetlands are the most common wetland type in the analysis area and are primarily found along creek channels, coulees, and in association with prairie potholes formed by depressions left by glaciation. Coulees often have a flat-bottomed valley enclosed by somewhat steep hillsides with the wetland areas generally restricted to the narrow incised stream channel (MATL 2006b). Many of the prairie potholes are less than 1 acre in size and may have permanent, semipermanent, or seasonal to temporary inundation (Montana Partners in Flight 2000). Prairie potholes can either be landlocked, or have a drainage outlet to an adjacent stream or other potholes.

The palustrine emergent wetlands account for approximately 69 percent of the total wetlands (**Table 3.6-1**). Palustrine emergent wetlands are characterized by erect, rooted, herbaceous hydrophytic vegetation and are often dominated by perennial plants (Cowardin and others 1979). Drainages in the MATL analysis area contain overstory vegetative communities comprised of trees and shrubs, such as boxelder (*Acer negundo*), silver sagebrush, chokecherry, Woods' rose, willow, silver buffaloberry, and western snowberry (MATL 2006b). The palustrine emergent wetland areas are found primarily along the current channels and in older meander lobes within the drainage valley. Palustrine emergent vegetation may occur as an understory component in areas mapped as riparian or forested sections of the drainage. Where not previously cultivated, the vegetation types in the prairie pothole wetlands within the analysis area are dominated by herbaceous communities, including water sedge (*Carex aquatilis*), clustered field sedge (*Carex praegracilis*), narrow spike reedgrass (*Calamagrostis stricta*), Baltic rush (*Juncus balticus*) and tufted hairgrass (*Deschampsia caespitosa*), as well as shrubby cinquefoil (*Dasiphora floribunda*) (MATL 2006b).

Most of the prairie potholes in the analysis area have standing water for much of the growing season in years of normal or above normal precipitation. These depressional geomorphic features capture water from precipitation, snowmelt, and from groundwater (Hansen and others 1995). Typically the water is retained in the potholes due to a bottom soil layer with reduced permeability. Evaporation and transpiration are the major causes of water loss, although seepage and surface outflow can also be sizable for some potholes (Hanson and others 1995). However, during dryer periods, some portions of potholes often become incorporated into farming plans and are either planted to row crops (for example wheat) or are mowed as part of a haying operation. Prairie pothole wetland losses are estimated to be from 30 to 50 percent in Montana (Montana Partners in Flight 2000). Prairie pothole wetlands are often difficult to delineate and characterize because the wetland indicators and other parameters may be periodically lacking due to normal seasonal or annual variations in environmental conditions that result from causes other than human activities or catastrophic natural events (COE 1987). Prairie potholes occur throughout the analysis area; however, the potential to encounter prairie potholes declines in the southern portion of the analysis area due to changes in geomorphology and to agricultural practices that may have impacted or eliminated the smaller wetlands.

The most notable lacustrine wetland area in the analysis area is found in the southern portion. Benton Lake NWR is located 12 miles north of Great Falls. It is at the western edge of the farmed Prairie Pothole region, a region characterized by millions of wetlands or potholes, which serve as the breeding ground for most of the Nation's waterfowl (MATL 2006b). The 19-square-mile Benton Lake NWR was established in 1929 as a refuge and breeding ground for birds. Despite its name, Benton Lake is actually a 5,000-acre shallow wetland created by the last continental glacier thousands of years ago. During the late 1950s and early 1960s, a pump house and pipeline were built to bring water to the refuge from Muddy Creek. Dikes were built to divide the wetland into manageable units, and refuge roads and facilities were constructed. Water still flows from the original pump station on Muddy Creek, but the refuge wetlands have been further divided for more efficient water management.

The wetland areas provide valuable tree and understory plant diversity, stable coulee bottoms that can attenuate and alter flood flows, and valuable breeding areas for duck species, eared, horned, and red-necked grebes, Franklin's gull, Forster's terns, black terns, yellow-headed blackbirds, and Wilson's phalaropes. MATL project wetlands also provide important habitat for nesting and foraging for many birds and other wildlife species. In particular, the 5,000 acres of shallow wetlands associated with the Benton Lake NWR area are managed primarily to provide refuge and breeding ground for birds.

The riverine wetland types mapped within the analysis area are the seasonally and permanently flowing river channel bottoms associated with the Teton River, Pondera Coulee, Spring Coulee, Dry Fork Marias, Schultz Coulee, Bullhead Creek, Marias River, and Red River. The Marias, Dry Fork Marias, and Teton rivers support the most important forested riparian habitats in the analysis area (MATL 2006b). The riverine habitats typically have an understory of grasses and shrubs with an overstory of cottonwood trees (plains cottonwood and narrowleaf cottonwood) and other larger deciduous shrubs and trees (chokecherry, wild currant, Woods' rose, and willows) that intermittently line the rivers.

3.6.3 Environmental Impacts

This section describes the types of impacts that could occur and effects of these impacts on wetland resources specifically. **Table 2.3-4** addresses mitigation measures and best management practices that can be implemented to reduce potential impacts to wetlands and surface water resources.

Potential impacts to wetlands associated with the construction and operation of the MATL 230-kV transmission line project include:

1. alterations to the wetland hydrology,
2. alterations to the wetland plant communities, and
3. loss of wetlands due to filling or sedimentation.

Alterations to the wetland hydrology would most likely occur during the construction phase when working in adjacent areas causes surface water flows to be changed or modified. Many of the wetlands in the analysis area are palustrine emergent wetlands. These wetlands are situated just below the high water line; thus any small modification to the existing drainage pattern could potentially re-direct surface water flows away from these areas that depend on temporary flood waters to saturate the soils and create wetland conditions.

Alterations to the wetland plant community are also most likely to occur during the transmission line construction phase. A change in the composition of the wetland plant community may be associated with and result from an alteration to the wetland hydrology, or this impact may be unrelated. A wetland plant community may be physically altered by mechanical disturbance during the construction activities, or the vegetation could be only temporarily trampled from parking or driving across these areas.

No direct filling or covering of wetland areas is intended as a result of implementing any of the action alternatives. However, construction activities adjacent to wetlands may inadvertently result in erosion sediment transport and deposition into wetlands as the result of exposed soils and concentrated runoff down vehicle tracks and roads. MATL would implement erosion and sediment control practices as required by the State of Montana (**Appendix F**). MATL would also reduce or avoid impacts to wetlands by implementing mitigation, avoidance, or other environmental protection measures (MATL 2006b).

The areas of individual wetlands were determined based on the shape and size of the polygons in the existing NWI maps. MATL would avoid individual wetlands by working with the engineering designs to span or align around all wetlands within the 500-foot-wide alignment (MATL 2006b). In addition, the Benton Lake NWR wetlands would not be directly affected by the action alternatives. Potential indirect impacts to the Benton Lake NWR wetlands would be associated with a potential reduction of habitat (Section 3.8 Wildlife).

In order to assess potential impacts of the MATL transmission line project to wetlands, typical construction and operational practices used in the utility industry were reviewed. Potential impacts to wetlands were evaluated in association with the need to construct access roads and in relationship with the methods used and engineering constraints involved with spanning over and constructing around wetlands and drainage crossings. MATL may not require any Section 404 and 401 permits if it avoids discharging sediment or fill materials into wetlands or Waters of the U.S. The wetland impact assessment assumes MATL would comply with all requisite permitting requirements. Each alternative was evaluated to determine the potential number of wetlands, size of wetlands, and the general location of wetlands and ephemeral drainage crossings.

3.6.3.1 Alternative 1 – No Action

The No Action alternative would produce no adverse impacts to wetland resources. However, negligible to minor, long-term adverse impacts would continue from existing land uses. Runoff and erosion, primarily from agricultural lands, would continue to carry sediments and possibly nutrients and other pollutants to wetlands and surface water resources causing potential impacts. Sedimentation is a major contributor to the impairment of streams and rivers and reduction of functions for wetlands in Montana and the U.S.

3.6.3.2 Alternative 2 – Proposed Project

Wetland types and amounts potentially impacted by Alternative 2 are provided in **Table 3.6-3**.

TABLE 3.6-3
WETLANDS POTENTIALLY AFFECTED BY ALTERNATIVE 2

NWI Wetland Class	Acres within 500-foot alignment
Palustrine Emergent (PEM)	59.1
Palustrine Unconsolidated Shore/Bottom/Aquatic Bed (PUS, PUB, & PAB)	5.3
Lacustrine (L2)	0.8
Riverine (R3)	2.4
Total	67.6

In total, about 67.6 acres of wetlands have been mapped within the 500-foot Alternative 2 alignment. The largest wetland crossing within the Alternative 2 500-foot alignment would be approximately 510 feet. This wetland could be spanned assuming a typical span length of 500 to 800 feet. The wetland total acreage does not include any wetlands that were visually identified by MATL (MATL 2006b) in the approximately 22 miles of the Alternative 2 alignment through Teton County where no official NWI data currently exist. Recent aerial photographs from 2005 of the Alternative 2 alignment through Teton County were reviewed. In concurrence with MATL, several small wetland areas were observed on the photographs, but acreage quantification was not possible. No single large wetland or concentration of wetlands covering more than approximately 500 feet was noted.

Most of the potentially impacted wetlands (approximately 87 percent) were palustrine emergent wetlands with only about 2.41 acres of riverine wetlands impacted at the Teton River, Dry Fork Marias River, and Marias River crossings. Approximately 75 percent of the potentially impacted wetlands are located in the area north of Cut Bank (Milk River Pothole area) and an area east and south of Conrad (Teton River area). The potential impacts to these wetlands are alterations to the hydrology, alterations to the plant communities, and some minor filling from local sediment. The greatest potential impact to wetlands would be during construction.

The Alternative 2 alignment does cross approximately 0.8 acres of a delineated seasonally flooded lacustrine area near milepost 5 by Black Horse Lake. MATL has stated that it would conduct a soil investigation of this area and use either self-supporting steel poles with concrete caisson foundations or 3-pole wood structures with poles installed inside pipe piles. Guy wire screw anchors would be installed to an adequate holding capacity depth for this specific location (Williams 2007). The remaining wetlands are scattered along the alignment, including near the Benton Lake NWR area. Overall with successful implementation of the MATL proposed environmental protection measures and the required DEQ environmental specifications, impacts to wetlands under Alternative 2 would be minor and primarily of short duration.

3.6.3.3 Alternative 3 – MATL B

Alternative 3 is 8.3 miles shorter than Alternative 2 (121.6 miles vs. 129.9 miles) due to more diagonal segments along the entire alignment. The wetland types impacted by this alternative are of a similar class as those under Alternative 2, but the area of potentially impacted wetlands is less under Alternative 3 **(Table 3.6-4)**.

TABLE 3.6-4
WETLANDS POTENTIALLY AFFECTED BY ALTERNATIVE 3

NWI Wetland Class	Acres within 500-foot alignment
Palustrine Emergent (PEM)	49.7
Palustrine Unconsolidated Shore/Bottom/Aquatic Bed (PUS, PUB, & PAB)	8.3
Lacustrine (L2)	0.8
Riverine (R3)	3.5
Total	62.3

A total of about 62.3 acres of wetlands within the 500-foot alignment have been mapped along the Alternative 3 alignment, compared to 67.6 acres along the Alternative 2 alignment. The total wetland area does not include any wetlands visually identified by MATL (MATL 2006b) during the baseline field work in the 25 miles of this alternative alignment where no official NWI data currently exist. Aerial photographs from 2005 of the 25-mile section where no wetland data exist were reviewed. In concurrence with MATL, several small wetland areas were observed on the photographs, but exact acreage quantification was not possible. No single large wetland or a concentration of wetlands that could not be spanned by 500- to 800-foot span lengths was noted.

Most of the impacted wetland acres (58 acres or 93 percent) are palustrine emergent or palustrine unconsolidated wetlands with about 3.5 acres of riverine wetlands impacted at the Teton, Dry Fork of the Marias, and the Marias River crossings. This Alternative 3 alignment is similar to Alternative 2 with approximately 75 percent of the potentially impacted wetlands located north of Cut Bank (Milk River Pothole area) and east and south of Conrad (Teton River area). The Alternative 3 alignment would also cross approximately 0.8 acre of the seasonally flooded lacustrine area near milepost 5 by Black Horse Lake. MATL would enact the same procedures for any structures placed in this area, as described for Alternative 2 above. The remaining wetlands are scattered along the alignment, including near the Benton Lake NWR area. Overall with successful implementation of the MATL proposed environmental protection measures and the required DEQ environmental specifications, impacts to wetlands under Alternative 3 would be minor and primarily of short duration.

3.6.3.4 Alternative 4 – Agency Alternative

Alternative 4 is 139.6 miles in length, which is about 9.7 miles longer than the proposed Project (139.6 miles compared to 129.9 miles). This alternative is composed of 60.9 miles of the Alternative 2 alignment and 78.7 miles of agency-developed alignments that branch off the Alternative 2 alignment. The 78.7 miles of agency alignments were developed to address identified local scoping issues and concerns, but were not specifically developed to mitigate any potential impacts to wetland resources. The wetland types impacted by this alternative are similar to those under the Alternative 2 and Alternative 3. However, the area of potentially impacted wetlands is greater for Alternative 4, primarily due to its greater length. The wetland types impacted under this alternative are shown in **Table 3.6-5**.

In total approximately 76.4 acres of wetlands have been mapped within the 500-foot Alternative 4 alignment, compared to 67.7 acres along the Alternative 2 alignment. The total wetland area does not include any wetlands visually identified by MATL (MATL 2006b) during the baseline field work in the approximately 25 miles of this alternative alignment where no official NWI data currently exist. Aerial photographs from 2005 of the 25-mile section where no wetland data exist were reviewed. In concurrence with

MATL, several small wetland areas were observed on the photographs, but exact acreage quantification was not possible. No single large wetland or a concentration of wetlands that could not be spanned by 500- to 800-foot span lengths was noted.

TABLE 3.6-5 WETLANDS POTENTIALLY AFFECTED BY ALTERNATIVE 4	
NWI Wetland Class	**Acres within 500-foot alignment**
Palustrine Emergent (PEM)	69.8
Palustrine Unconsolidated Shore/Bottom/Aquatic Bed (PUS, PUB, & PAB)	4.2
Lacustrine (L2)	0.0
Riverine (R3)	2.4
Total	76.4

Alternative 4 traverses around the southern and western sides of Benton Lake NWR area and would potentially impact fewer acres of wetlands from Great Falls to milepost 27.3, compared to Alternative 2, for this area. Several smaller palustrine and lacustrine wetlands, directly north of Great Falls (Black Horse Lake area) and along the western side of Benton Lake NWR, would be avoided by the Alternative 4 alignment.

The Alternative 4 alignment would cross Lake Creek, Teton River, Dry Fork Marias River, Marias River, and several major coulees (South Pondera, Pondera, Favot, and Big Flat. The higher proportion of coulees and unfarmed drainages that were used by Alternative 4 in order to avoid farmed land is a primary reason for the increased number of wetlands crossed by the Alternative 4 alignment compared to alternatives 2 and 3. The Alternative 4 alignment east of Conrad crosses slightly larger and more defined drainages due to its more eastern location. Drainages generally flow west to east in this area and tend to have more defined channels as they flow toward the Missouri River.

Most of the potentially impacted wetland acres (74 acres or 97 percent) are palustrine emergent or palustrine unconsolidated wetlands with only about 2.4 acres of riverine wetlands impacted at the Teton, Dry Fork of the Marias, and Marias River crossings. Alternative 4 would avoid the small seasonally flooded lacustrine area at Black Horse Lake. Overall, with successful implementation of the MATL proposed environmental protection measures and the required DEQ environmental specifications, impacts to wetlands under Alternative 4 would be minor and primarily of short duration.

Potential Mitigation and Best Management Practices

Mitigation measures have been developed by MATL to help avoid and minimize impacts to wetlands from the proposed Project and alternatives. MATL's mitigation measures are not necessarily exclusive for wetland and stream crossings and may provide concurrent benefits for impacts to soils and other biological resources. MATL's stated measures to mitigate potential impacts to wetlands include:

1) Avoiding existing wetlands and drainage channels to the maximum extent possible by completely spanning all wetlands, prairie pothole wetlands, riparian vegetation, coulees, Marias River, and Teton River.
2) Avoiding placement of transmission line structures (poles) in riparian vegetation areas.
3) Implementing erosion and sediment control best management practices during construction, as required by the State of Montana.
4) Completing timely seeding of all areas affected by project activities with native and/or non-invasive seed mixes to prevent soil erosion.

Agency-developed mitigation measures, applicable to wetlands, would be attached to DEQ's Environmental Specifications (**Appendix F**). One agency mitigation measure for wetlands would be for MATL to delineate all wetlands and waters of the U.S. along any selected alignment that traverses Teton County where no official NWI data currently exist. Delineating the wetlands would assist in minimizing potential alterations to the hydrology and plant communities during construction and allow placement of mitigation measures at the appropriate locations. Additional mitigation measures specific to wetlands may be required by the U.S. Army Corps of Engineers under their Nationwide # 12 Permit (Utilities Line Activities) which would apply to any construction, maintenance, and repair of utility lines and associated facilities in wetlands and waters of the U.S. The additional wetland mitigation measures would help ensure no net loss of wetland acreage and a consistent approach for mitigating potential impacts to wetlands associated with the MATL transmission line project.

3.6.4 Floodplain or Wetland Assessment

This assessment of potential floodplain or wetland impacts of the proposed Project is included pursuant to DOE requirements in 10 CFR 1022.

3.6.4.1 Project Description

The proposed Project is described in Section 2.3. Some transmission line support structures would be located in floodplains. The "high hazard area" of a floodplain is defined in 10 CFR 1022.4 as "those portions of riverine and coastal floodplains nearest the source of flooding that are frequently flooded and where the likelihood of flood losses and adverse impacts on the natural and beneficial values served by floodplains is greatest." Structures would not be constructed below the normal high-water mark of surface water bodies, and high hazard areas of floodplains would be avoided.

3.6.4.2 Floodplain or Wetland Impacts

Surface water and wetlands resources are described in Section 3.5.2 and 3.6.2, respectively. Construction of structures would affect floodplains. Construction could result in erosion and sedimentation in surface water, especially if flooding occurs during construction. Construction would not occur in flowing or standing water. Structures and access roads would not be constructed in obvious flood channels. Floodplain storage volumes would not be affected, and flood stages would not increase measurably, due to the presence of structures. Little or no riparian vegetation would be disturbed during construction or operation of the transmission line. All wetlands would be spanned.

3.6.4.3 Alternatives

All of the alternatives considered would cross floodplains. Few structures would be placed directly in floodplains, so none of the alternatives is expected to have significant adverse impacts on floodplain function. No adverse impacts from flooding are expected to adjacent or downstream property owners in these sparsely populated areas.

3.7 Vegetation

3.7.1 Analysis Methods

Analysis Area

Quantitative analysis of acres for various vegetation communities in each alignment was derived from orthophotograph interpretation of cover types along the proposed alternatives. Assumptions associated with GIS derived acreages of vegetation resources include:

- GIS data are based on 2005 orthophotographs (Montana NRIS 2006a) that were hand digitized in 2006. Some misidentification may have occurred due to orthophotograph resolution, and changes in vegetation type and condition since the photographs were taken.
- The analysis area consists of 250 feet on either side of each alignment centerline.
- Except as noted, all newly constructed access roads would be located within the 500-foot alignments.

All common and scientific plant names are based on the USDA PLANTS Database (NRCS 2006b).

Information Sources

Resources addressed in this section include the various vegetation community types, special status plant species, and noxious weeds. Community type and distribution data are based on field evaluations conducted in 2005 by MATL. Additional data sources include the NHP (2006b) and the Montana NRIS. Montana Gap Analysis Program (GAP) (Redmond and others 1998) data were reviewed and determined to be inappropriate for vegetation classification at this scale and inaccurate due to land cover changes since publication of the data set.

3.7.2 Affected Environment

This section addresses the environmental baseline conditions for vegetation resources in the Project area. The large spatial extent of the Project area encompasses many different vegetation types and communities. Vegetation communities in Montana are generally determined by topography, soil type, and climate (NHP 2002). In general, dominant vegetative communities include irrigated and non-irrigated farmland, fallow crops, CRP areas, native shrub and grassland communities, and riparian and wetland communities.

Three dominant Level IV ecoregions, described by Woods and others (2002), are found within the Northwestern Glaciated Plains Ecoregion. The Northwest Glaciated Plains Ecoregion includes the North Central Brown Glaciated Plains, Foothill Grasslands, and Milk River Pothole Uplands Level IV regions. The Northwestern Glaciated Plains are characterized as the transition zone between the more level, moister Northern Glaciated Plains to the east and the dryer, irregular Northwestern Great Plains to the west and southwest. The Northwestern Glaciated Plains are well suited for agriculture with much of the area having been converted to farmland. **Table 3.7-1** presents the environmental attributes of the three Level IV Ecoregions found in the Project area.

TABLE 3.7-1
PROJECT AREA LEVEL IV ECOREGIONS

Level IV Ecoregion	Elevation (feet)	Precipitation Mean Annual (inches)	Potential Natural Vegetation
North Central Brown Glaciated Plains	2,500 to 4,200	11 to 15	Grama- needlegrass-wheatgrass
Foothill Grasslands	3,500 to 5,500	11 to 22	Wheatgrass-fescue
Milk River Pothole Uplands	3,700 to 4,350	11 to 14	Grama- needlegrass-wheatgrass

Notes:
Sources: Woods and others (2002) and Kuchler (1964).

Potential natural vegetation for the Project area is dominated by the grama-needlegrass-wheatgrass and wheatgrass-fescue community types (Woods and others 2002). Mixed grass prairie in these areas is typified by open (40 to 60 percent canopy cover) graminoid dominated vegetation. Dominant native graminoids throughout the Project area include bluebunch wheatgrass (*Pseudoroegneria spicata*) and blue grama (*Bouteloua gracilis*) (**Table 3.7-2**). Bluebunch wheatgrass often shares dominance with needle-and-thread (*Hesperostipa comata*); blue grama is usually present in differing amounts depending on past grazing history. Western wheatgrass (*Pascopyrum smithii*) is also important in localized areas. Shrub cover is typically less than 10 percent in these communities with dominant species including broom snakeweed (*Gutierrezia sarothrae*), plains pricklypear (*Opuntia polyacantha*), and occasionally rubber rabbitbrush (*Ericameria nauseosa*)(NHP 2006a). Saline areas support alkali grass (*Puccinellia* spp.), wild barley (*Hordeum* spp.), greasewood (*Sarcobatus vermiculatus*), saltwort (*Salicornia rubra*), and Pursh seepweed (*Suaeda calceoliformis*)(MATL 2006b).

TABLE 3.7-2 DOMINANT PLANT SPECIES COMBINATIONS IN THE PROJECT AREA		
Common Name	**Scientific Name**	**Location**
Short- and Mid-grass Prairie		
Blue Grama	*Bouteloua gracilis*	Breaks above Marias and Teton rivers
Thickspike Wheatgrass	*Elymus lanceolatus*	North of Cut Bank, some CRP
Needle-and-thread	*Hesperostipa comata*	Breaks above Marias and Teton rivers, coulees
Northern Porcupine Grass	*Hesperostipa curtiseta*	Breaks above Marias and Teton rivers
Green Needlegrass	*Nassella viridula*	Southern, below 230-kV switch yard
Western Wheatgrass	*Pascopyrum smithii*	Breaks above Marias and Teton rivers, coulees
Foxtail Barley	*Hordeum jubatum*	Saline soil patches
Badlands		
Silver Sagebrush	*Artemisia cana*	Kevin Rim, Dry Fork Marias River
Thickspike Wheatgrass	*Elymus lanceolatus*	North of Cut Bank
Creeping Juniper	*Juniperus horizontalis*	Trunk Butte, Kevin Rim
Shrublands		
Silver Sagebrush	*Artemisia cana*	Marias and Teton rivers; Kevin Rim
Blue Grama	*Bouteloua gracilis*	Missouri Plateau breaks/Rim north of Great Falls; Marias and Teton rivers
Needle-and-thread	*Hesperostipa comata*	Missouri Plateau breaks/Rim north of Great Falls; Marias and Teton rivers
Western Wheatgrass	*Pascopyrum smithii*	Breaks above Marias and Teton rivers, coulees
Silver Buffaloberry	*Sheperdia argentea*	Red River; coulees north of Cut Bank and central area
Riparian		
Boxelder	*Acer negundo*	Kevin Rim; coulees
Silver Sagebrush	*Artemisia cana*	Marias, Teton, Dry Fork Marias rivers
Sedge	*Carex spp.*	Marias and Teton rivers, coulees
Spikerush	*Eleocharis spp.*	Teton River, coulees
Western Wheatgrass	*Pascopyrum smithii*	Marias and Teton rivers, coulees
Plains Cottonwood	*Populus deltoides*	Marias and Teton rivers
Narrowleaf Cottonwood	*Populus angustifolia*	Marias and Teton rivers
Chokecherry	*Prunus virginiana*	Marias and Teton rivers, coulees
Wild Currant	*Ribes spp.*	Marias and Teton rivers, coulees
Woods' Rose	*Rosa woodsii*	Marias and Teton rivers, coulees
Peachleaf Willow	*Salix amygdaloides*	Dry Fork Marias River, coulees
Willow	*Salix spp.*	Rivers, coulees
Silver Buffaloberry	*Sheperdia argentea*	coulees
Western Snowberry	*Symphoricarpos occidentalis*	Rivers, draws, coulees

Notes:
Table is not intended to be a comprehensive list, rather a characterization of dominant species in the Project Area.
Source: MATL 2006b.

Shrublands are comparatively rare and occupy a very small portion of the Project area. These communities tend to be small and isolated, and are generally located in badlands, upland draws, and terraces along riparian zones. The primary upland shrub community throughout the northern portion of the Project area is silver buffaloberry, which occurs as small, isolated patches in protected draws, drainage heads, and swale bottoms. Silver sagebrush occurs in relatively mesic sites, and is generally found as stringers on the upper floodplain terraces of the larger creeks and rivers in the area, particularly the Dry Fork Marias River (MATL 2006b) (**Table 3.7-2**).

Historically drought, fire, and periodic grazing were the dominant disturbance factors in this area (USDA Forest Service 1994). Conversion of native grasslands to agricultural uses has yielded highly fragmented native communities and altered historic disturbances. Other disturbances such as livestock grazing and rangeland managed under the CRP have produced native communities in a variety of ecological and successional conditions, in turn providing opportunity for the introduction of noxious weed species. CRP rangelands are dominated by wheatgrass (*Agropyron* spp.), alfalfa (*Medicago* spp.), clover (*Trifolium pratense*), and annual weeds for example, yellow salsify (*Tragopogon dubius*)(MATL 2006b).

3.7.2.1 Riparian Vegetation

Riparian vegetation plays an important role in many physical processes within riparian areas. Riparian vegetation dissipates energy and filters and retains sediment during peak flow periods. The vegetation also immobilizes, stores and transforms chemical inputs such as nitrogen. Riparian communities also stabilize streambanks and moderate instream conditions such as temperature, to provide valuable fish and wildlife habitat (Schultz and others 1994). Data characterizing riparian vegetation in the Project area rely predominately on MATL field investigations and were taken from the MATL MFSA application (MATL 2006b) unless otherwise noted.

Riparian communities within the Project area are generally restricted to the Marias River, Teton River, coulees, and along small ephemeral tributaries of the Marias and Teton rivers. The character of these riparian zones is directly related to soil moisture as determined by drainage basin size and dimensions, the annual flooding regime, and the proximity to the head of the drainage. These drainages experience large seasonal and annual hydrologic variability, resulting in relatively undeveloped floodplains in most of the Project area. Riparian habitats are better developed and more complex along the Marias River and Teton River. The coulees and smaller streams are relatively xeric and do not support substantial riparian vegetation. Generally, riparian zones within the Project area consist of herbaceous (*Carex* spp.) and willow communities in the wettest zones, which transition to western snowberry, Woods' rose, and silver sagebrush-western wheatgrass communities on the upper floodplain terraces. The Marias River and Teton River support narrow, discontinuous patches of cottonwood stands interspersed by broader terraces supporting silver sagebrush-western wheatgrass. On shaded slopes of valleys and river terraces, aspen, willow, cottonwood, and box-elder occur (**Table 3.7-2**).

The Marias and Teton rivers support the most important forested riparian habitats in the Project area. Riparian habitats along the Marias and Teton rivers include oxbow marshes and shrub-dominated terraces. The defining feature, however, is the cottonwood stands that line the rivers in places. Despite the fact that these riparian forests have been reduced and fragmented by conversion of the floodplain to irrigated agriculture and pasture (Jones 2003), they remain the only important native forested habitat within the Project area. The width of the cottonwood stands varies between 0 and 500 feet.

In places, mature cottonwood trees dominate the Marias River and Teton River riparian communities. Mesic floodplains support a diverse understory that may include box elder, peachleaf willow, yellow willow, and chokecherry. Xeric floodplain terraces support a less diverse shrub layer dominated by western snowberry and Woods' rose, or lack a shrub component altogether. The native grasses that once characterized these stands have been largely replaced by exotic species (for example, *Poa pratensis*). Grazing has greatly altered the shrub composition in these communities (Jones 2003). River terraces that are no longer subjected to seasonal flooding or are not farmed often support a silver sagebrush-western wheatgrass community. Lack of flood disturbance has changed the ecological dynamics by suppressing cottonwood regeneration and facilitating the colonization of invasive species such as Russian olive (*Elaeagnus angustifolia*).

Noxious Weeds

Invasive plants are often early successional, pioneer species that colonize quickly following disturbance. They typically produce large quantities of seed that germinate quickly and are highly competitive. Both native and nonnative invasive plants are found throughout Montana. Noxious weeds are defined as "any exotic plant species established or that may be introduced in the state that may render land unfit for agriculture, forestry, livestock, wildlife, or other beneficial uses or that may harm native plant communities" (7-22-2101, MCA). Furthermore, noxious weeds are highly aggressive and lack native insects and diseases that aid in limiting the spread and distribution of the species. Some species can establish without soil disturbance and displace healthy native communities, resulting in noxious weed monocultures. Localized areas of spotted knapweed were found in the floodplain of the Marias River near Sullivan Bridge (Glacier County) and in the floodplain of the Teton River near Kerr Bridge (Teton County). Leafy spurge is also broadly distributed along the Marias River. Two additional noxious weeds, Canada thistle and field bindweed are located in the Project area. Canada thistle was found in the terraces above the Dry Fork Marias River

(MATL 2006b). Montana Noxious Weed Survey and Mapping project data, hosted on NRIS, indicate populations of Dalmation toadflax near Conrad, Russian knapweed along the Marias and Teton river corridors, and leafy spurge scattered throughout the Project area (Montana Noxious Weed Survey and Mapping 1998). **Table 3.7-3** lists several other noxious weed species located within counties in the Project area.

TABLE 3.7-3
CATEGORY ONE AND TWO NOXIOUS WEEDS FOUND IN COUNTIES WITHIN THE PROJECT AREA

Common Name	Scientific Name	Habitat
Category 1- Widespread Noxious Weeds		
Canada thistle	*Cirsium arvense*	Reported in all project area counties.
Common tansy	*Tanacetum vulgare*	Reported in Glacier, Cascade and Chouteau Counties. Historically present in Toole and Pondera Counties.
Dalmatian toadflax	*Linaria dalmatica*	Reported in all project area counties.
Diffuse Knapweed	*Centaurea diffusa*	Reported in all project area counties.
Field bindweed	*Convolvulus arvensis*	Reported in all project area counties.
Houndstongue	*Cynoglossum officinale*	Reported in all project area counties.
Leafy spurge	*Euphorbia esula*	Reported in all project area counties.
Ox-eye daisy	*Chrysanthemum leucanthemum*	Reported in Glacier, Cascade and Chouteau Counties. Historically present in Pondera and Teton Counties.
Russian knapweed	*Acroptilon repens*	Reported in all project area counties.
Spotted knapweed	*Centaurea stoebe*	Reported in all project area counties.
St. Johnswort	*Hypericum perforatum*	Reported in Glacier, Cascade and Chouteau Counties. Historically present in Teton County.
Sulfur cinquefoil	*Potentilla recta*	Reported in Glacier, Pondera, Cascade and Chouteau Counties. Historically present in Toole County.
Whitetop or hoary cress	*Cardaria draba*	Reported in all project area counties except Glacier County (historically present).
Yellow toadflax	*Linaria vulgaris*	Reported in all project area counties.
Category 2- Established New Invaders		
Dyers woad	*Isatis tinctoria*	Historically present in Pondera and Chouteau Counties, but not currently reported.
Meadow hawkweed complex	*Hieracium pratense, H. floribundum, H. piloselloides*	Historically present in Pondera and Chouteau Counties.
Perennial pepperweed	*Lepidium latifolium*	Reported in Toole, Pondera, Teton, Cascade and Chouteau Counties.
Purple loosestrife or Lythrum	*Lythrum salicaria, L. virgatum*	Reported in Pondera and Cascade Counties. Historically present in Toole County.
Tall buttercup	*Ranunculus acris*	Reported in Glacier County. Historically present in Teton County.
Tamarisk	*Tamarix* spp.	Reported in Cascade and Chouteau Counties. Historically present in Teton County.

Source: MATL 2006b

3.7.3 Environmental Impacts

3.7.3.1 Alternative 1 - No Action

Alternative 1 would not have any effects on vegetation resources (riparian vegetation, species of concern, or weed control) in the analysis area.

3.7.3.2 Alternatives 2, 3, and 4 – Action Alternatives

Rangeland vegetation, such as grassland, improved pasture, seeded grasslands, shrubland, badland, and riparian and wetland areas, would be removed by the construction of access roads and structures and at construction staging areas. Impacts to riparian and wetland areas would be minimal as these areas would only be disturbed when absolutely necessary. Maintenance activities would not likely result in additional ground disturbance. Alternative 4 impacts the greatest amount of rangeland cover types (50.8 miles) and is 9.7 miles longer than Alternative 2. The increased crossing in rangeland cover types would result in more tower structures and access roads, thus increasing rangeland impacts. Disturbance due to maintenance activities would also increase over the life of the Project due to increased structure and road placement in rangeland and vegetation. Linear miles of rangeland cover types affected by alternative are presented in **Table 3.7-4**. Disturbance resulting from staging areas would be similar for all alternatives.

TABLE 3.7-4
NATIVE VEGETATION COVER TYPES
CROSSED BY ALTERNATIVES 2, 3, AND 4

Rangeland Cover Types	Alternative 2		Alternative 3		Alternative 4	
	Miles	Cover Types (percent)	Miles	Cover Types (percent)	Miles	Cover Types (percent)
Grassland/ Shrubland	33.6	25.9	21.6	17.8	49.3	35.2
Riparian	1.9	1.5	1.3	1.1	1.5	1.1
Forest (Cottonwood)	0.0	0.0	0.1	0.1	0.0	0.0
Total	35.5	27.4	23.0	19.0	50.8	36.3
Total Line Length	129.9	--	121.6	--	139.6	--

Notes:
Source: Orthophotographs 2005 (Montana NRIS 2006a) interpretation of land cover in vegetation analysis area, October 2006.
-- Not applicable

H-frame structures would be the preferred structure for areas of native vegetation and would disturb approximately 36 square feet (**Table 2.3-1**) for each structure during construction. These areas would be revegetated, thus only the area occupied by structures would be impacted for the life of the Project. Operational disturbance, the actual area occupied by the poles, would be approximately 8 square feet per H-frame. Operation disturbance would include H-frame structure base disturbance, other pole base disturbance, and access road disturbance. Construction disturbance would also include assembling structure disturbance, vehicle turn-around areas disturbance, and line pulling and tensioning area disturbance, construction road disturbance, and pole installation disturbance areas. **Table 3.7-5** presents the estimated amount of operational disturbance associated with H-frame structures in native cover types by alternative. MATL (2006b) proposes to avoid riparian disturbance wherever possible; however, structures may be placed in riparian habitat. Therefore, riparian land cover is included in the analysis of ground disturbance resulting from H-frame structures (**Table 3.7-5**). Cottonwood stands were not included in the analysis due to its scarcity (**Table 3.7-4**).

TABLE 3.7-5
ESTIMATED OPERATION DISTURBANCE FOR H-FRAME STRUCTURES BY NATIVE COVER TYPE

Rangeland Cover Types	Alternative 2		Alternative 3		Alternative 4	
	Percent Land Cover	Operational Disturbance (square feet)[a]	Percent Land Cover	Operational Disturbance (square feet)[a]	Percent Land Cover	Operational Disturbance (square feet)[a]
Grassland/ Shrubland	25.9	2,152	17.8	1,384	35.2	3,152
Riparian	1.5	122	1.1	80	1.1	80

Notes:

a Average 660-foot span between structures and assuming 8 square feet of operational disturbance per H-frame.

Access road construction and maintenance would impact native vegetation during line construction and project maintenance. Following construction, many of the road beds would be revegetated and controlled for noxious weeds resulting in resource recovery in 3 to 5 years. During vegetation recovery the likelihood of noxious weed invasion would increase. Implementation of the proposed weed control program would greatly reduce the establishment of weed species.

The major threat to vegetation resources from maintenance activities is the introduction of noxious weed species. Project maintenance would also create minor vegetation disturbance throughout the life of the project. Vegetation would not be greatly affected by occasional trampling from maintenance vehicles; however, the resulting ground disturbance and physical plant damage provide an opportunity for weed invasion. Adherence to the proposed weed management plan would reduce the likelihood of weed establishment as a result of maintenance activities.

Estimates of total ground disturbance from construction activities indicate a total disturbance of approximately 38 acres under Alternative 2 (**Table 2.3-2**), 41 acres under

Alternative 3 (**Table 2.4-1**), and 48 acres under Alternative 4 (**Table 2.5-1**). The total acreage of construction disturbance would be more than operation disturbance. Construction disturbance would be of varying intensity, with most areas, such as staging areas, requiring reseeding. All areas of disturbance would require noxious weed monitoring and possible weed treatment.

Estimates of total ground disturbance from operation activities include approximately 6 acres for Alternative 2, 10 acres for Alternative 3, and 11 acres for Alternative 4. Short- and long-term ground disturbance is greatest under Alternative 4.

Proposed practices to reduce potential vegetation loss and noxious weed invasion would include seeding disturbed areas with appropriate weed-free seed mixes, using weed-free borrow materials, and inventorying and treating noxious weeds according to the Noxious Weed and Invasive Plant Control Plan (MATL 2006b). The combination of the proposed revegetation and weed control measures along with follow-up monitoring by DEQ would reduce the potential for native species displacement and noxious weed spread during project construction and long-term maintenance.

Riparian Vegetation

DEQ would apply its environmental specifications to the project. The specifications include the requirement that MATL avoid placing poles or roads in designated 100-year flood plains.

Weed Control

Ground disturbance and increased travel during line construction and maintenance could increase the risk of noxious weed spread. Weed infestations are actively controlled in cropland and along country roads and other rights of way; however, resources are often limited when treating weeds in native vegetation. The weed control area for this project is defined by MATL as:

> "…all lands disturbed by construction activities plus a 30-foot buffer area around disturbances. Newly constructed roadways, where needed, are expected to be about 14 feet wide with varying widths of cut and fill slopes. To buffer all disturbed areas it is estimated that the 'weed control area' will consist of an approximately 100-foot corridor along all roadways and tensioning sites that are used for construction, and all lands within 50 feet of each new transmission line structure." (MATL 2006b)

The proposed weed control program is comprehensive. It incorporates a baseline inventory and marking of existing noxious weed populations, preventative measures (that is, washing vehicles, flagging weed populations to be avoided, and seeding following disturbance), and an integrated control program involving spraying target species in coordination with the BLM, state weed coordinator, and county weed boards and groups. Mitigation practices such as washing vehicles and equipment would occur throughout construction and continue during future line maintenance activities. Furthermore, MATL would report annually to federal, state, and county personnel on the condition and progress of this effort. The MATL integrated weed control plan would reduce the threat of noxious weed invasion following ground disturbance resulting from project construction and long-term maintenance. This weed control program would be implemented for the life of the project or as required by designated federal, state, and county personnel to ensure long-term noxious/invasive plan control measures are met in the weed control area (MATL 2006b).

In addition to noxious weed invasion, unlisted weed species are likely to increase due to ground disturbance and increased traffic and activity in the study area. It is assumed MATL would treat these species in conjunction with noxious weeds. On farmland, it is assumed landowners would manage these species with the same methods currently in use.

3.8 Wildlife

3.8.1 Analysis Methods

This section discusses the occurrence and distribution of vertebrates (mammals, birds, reptiles, and amphibians) within the Project area.

Analysis Area

The analysis area includes wildlife habitat potentially impacted by the implementation of the proposed alternatives. This area was defined as one mile on either side of the proposed and alternative transmission line alignments. Figures showing the alignments are located in Chapter 2.

Information Sources

Information on the distribution of wildlife in the Project area was obtained from a variety of sources, including: literature review, reports from the NHP and FWP, technical reports, peer-reviewed journal articles, and field investigations conducted during May, June, and August 2005 and April and May 2006. Field investigations were conducted to evaluate biological resources in the vicinity of the proposed transmission line alignments. The potential for occurrence of wildlife species not observed during field investigations was assessed based upon evaluation of species distribution and habitat use and information from previous research studies and biological reports (MATL 2006b).

Threatened, endangered, candidate, and sensitive species found within the Project area are discussed in Section 3.10.

3.8.2 Affected Environment

The Project area encompasses the following Level IV ecoregions of Montana including: the North Central Brown Glaciated Plains, the Foothill Grassland, and the Milk River Pothole Upland (Woods and others 2002). Within the Project area, human development and conversion to agricultural cropland have fragmented the native vegetation communities and reduced the quality of these areas as habitat for grassland species**.** Areas such as Benton Lake NWR, WPAs, CRP lands, river corridors, and the Kevin Rim are important wildlife habitats within the Project area. The five WPAs provide habitat for wildlife, especially waterfowl (**Figure 3.6-1**). CRP lands, which comprise approximately 17.7 percent of the Project area, also provide valuable cover and forage for various species of wildlife.

The Marias and Teton rivers represent the most important fisheries in the Project area, and the associated cottonwood stands are the only sizeable woodlands in the area. The extent of a shrub-steppe community (silver sagebrush-western wheatgrass) is limited to the Kevin Rim in the northeast corner of the Project area and lands southeast of Shelby north of the Marias River.

A list of wildlife species observed during field investigations is presented in **Table 3.8-1**. This table is not intended to be an exhaustive list of every species that occurs in the area, but rather to provide insight into current habitat conditions and general taxonomic groups that occur within the Project area.

TABLE 3.8-1
SPECIES OBSERVED IN THE PROJECT AREA DURING FIELD INVESTIGATIONS

Common Name	Scientific Name	Location
Birds		
Golden eagle	*Aquila chrysaetos*	West of Benton Lake NWR
Northern harrier	*Circus cyaneus*	West of Benton Lake NWR
Swainson's hawk	*Buteo swainsoni*	West of Benton Lake NWR; Bullhead Road; Kevin Rim
Red-tailed hawk	*Buteo jamaicensis*	West of Benton Lake NWR; Bullhead Road; north of Teton River
Ring-necked pheasant	*Phasianus colchicus*	McLean State Game Preserve; Bullhead Road
Sharp-tailed grouse	*Tympanuchus phasianellus*	West of Benton Lake NWR; Marias River; north of Shelby
Horned lark	*Eremophila alpestris*	North of Marias River
Meadow lark	*Sturnella neglecta*	Throughout
Common snipe	*Gallinago gallinago*	McLean State Game Preserve
Long-billed curlew	*Numenius americanus*	Throughout
Northern shoveler	*Anas clypeata*	North of Cut Bank
Blue-winged teal	*Anas discors*	North of Cut Bank
Mallard	*Anas platyrhynchos*	North of Cut Bank
Gray (Hungarian) partridge	*Perdix perdix*	Kevin Rim; McLean State Game Preserve
Mammals		
Coyote	*Canis latrans*	South of Cut Bank
American pronghorn	*Antilocapra americana*	Throughout
White-tailed jackrabbit	*Lepus townsendii*	Kevin Rim
Red fox	*Vulpes vulpes*	Bullhead Road
Mountain cottontail	*Sylvilagus nutalli*	Kevin Rim
Mule deer	*Odocoileus hemionus*	North of Teton River

Notes:
Source: MATL 2006b

3.8.2.1 Mammals

Mammal species found in the grasslands within the Project area are numerous and include mule deer, American pronghorn, badger (*Taxidea taxus*), Richardson's ground squirrel (*Spermophilus richardsonii)*, coyote, mountain cottontail and white-tailed jackrabbit (*Lepus townsendii*), and a variety of small rodents. These species are relatively common in grassland and sagebrush steppe habitats in northcentral Montana.

Badgers occur at low densities in grasslands throughout the Project area. Richardson's ground squirrel occurs in relatively low to moderate densities (Olson 2005a) within the Project area, including several active ground squirrel burrows in the Kevin Rim area (Zelenak 1996). Black-tailed prairie dogs (*Cynomys ludovicianus*) also occur in the Project area east of Interstate 15 and are further discussed in Section 3.10. Riparian habitats along the Marias River and Teton River support additional mammal species, including raccoons (*Procyon lotor*), red fox, and a variety of small rodents.

Ungulates

Mule deer occur in the Project area south of the Marias River in low to moderate densities along coulees and draws and irrigated lands east of Conrad. **Figures 3.8-1**, **3.8-2**, and **3.8-3** illustrate the winter distribution of mule deer within or adjacent to the Project area. The NHP Animal Field Guide indicates that white-tailed deer (*Odocoileus virginianus*) are generally restricted to the southern portion of the Project area, not reaching as far north as the Marias River (NHP 2004). However, landowners along the Marias River reported observing white-tailed deer in this area. The NHP Animal Field Guide reports that within the southern portion of the Project area, white-tailed deer stay close to riparian habitats along the Teton River and its tributaries. Data indicate that white-tailed deer do not have winter ranges within the Project area; however, the species' range east of the continental divide varies greatly from year to year depending on climatic conditions (Montana NRIS 2005).

American pronghorn occur in low to moderate densities throughout the central and southern portions of the Project area. Pronghorn were observed in grasslands, sagebrush steppe, and croplands during field investigations. NHP data indicate that pronghorn do not have a winter distribution within the Project area (Montana NRIS 2005); however, pronghorn populations tend to fluctuate with environmental conditions. NHP and FWP data indicate that elk (*Cervus elaphus*) do not generally occur within the Project area. The closest elk population is northeast of Shelby, outside the Project area, in the Sweetgrass Hills.

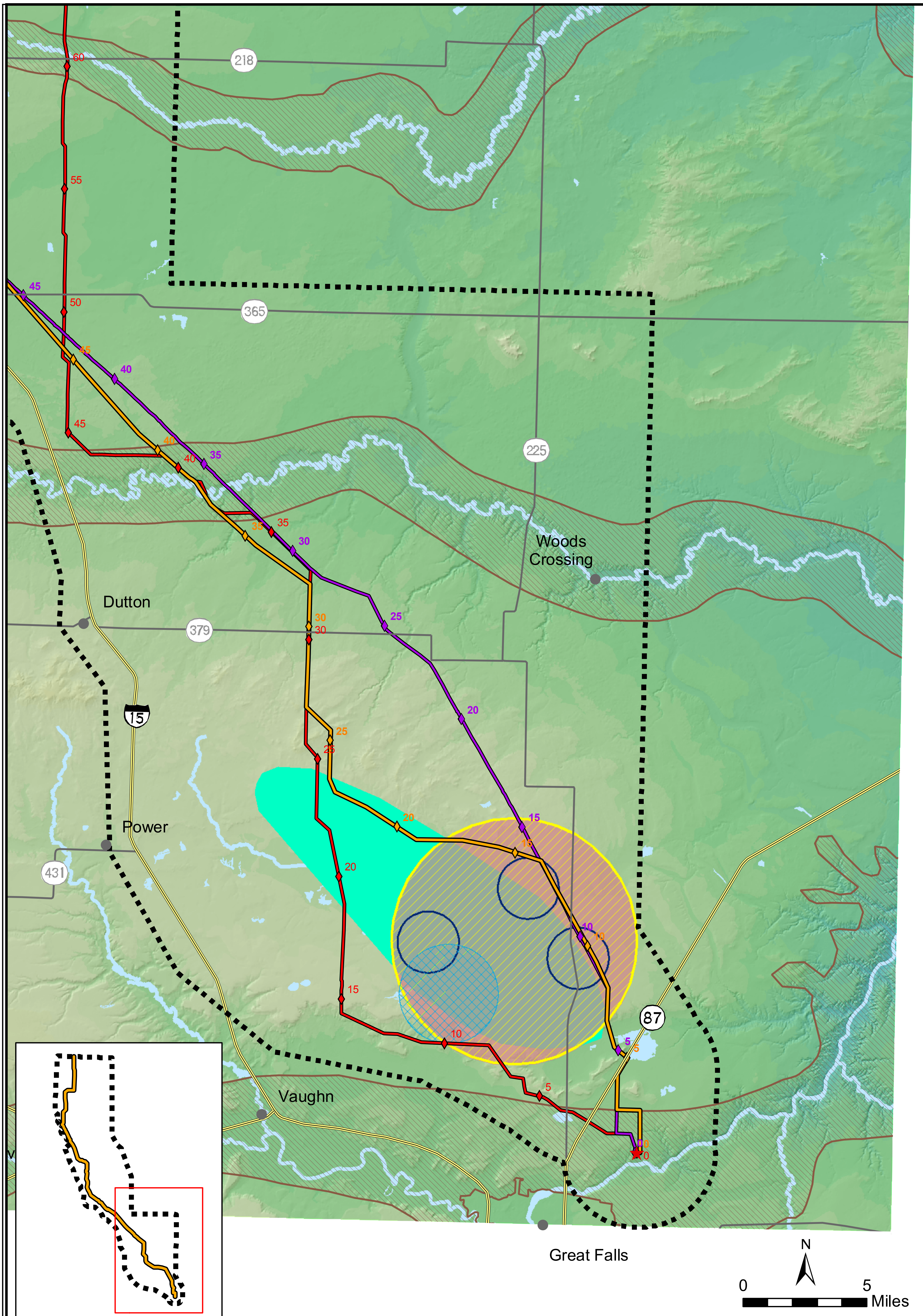


FIGURE 3.8-1
PROPOSED MATL POWERLINE
MULE DEER WINTER RANGE AND SPECIES OF SPECIAL CONCERN
SOUTH

LEGEND

- MULE DEER WINTER RANGE (MTFWP)
- BLACK-CROWNED NIGHT-HERON (*Nycticorax nycticorax*)
- BLACK-NECKED STILT (*Himantopus mexicanus*)
- BURROWING OWL (*Athene cunicularia*)
- FERRUGINOUS HAWK (*Buteo regalis*)
- PEREGRINE FALCON (*Falco peregrinus*)
- SHARPTAIL GROUSE LEKS PROTECTION BUFFER AREA
- ALT2 - ALIGNMENT
- MILE MARKERS
- ALT3 - ALIGNMENT
- MILE MARKERS
- ALT4 - ALIGNMENT
- MILE MARKERS
- CITIES AND TOWNS
- ALIGNMENT END AND EXIT POINTS
- STUDY_AREA
- MAJOR HIGHWAYS
- SECONDARY ROADS
- RIVERS AND STREAMS

GIS map by Patricia Williams -TTMTI 3-8-1-MuleDeerWinterRng-TnESpp-South.mxd

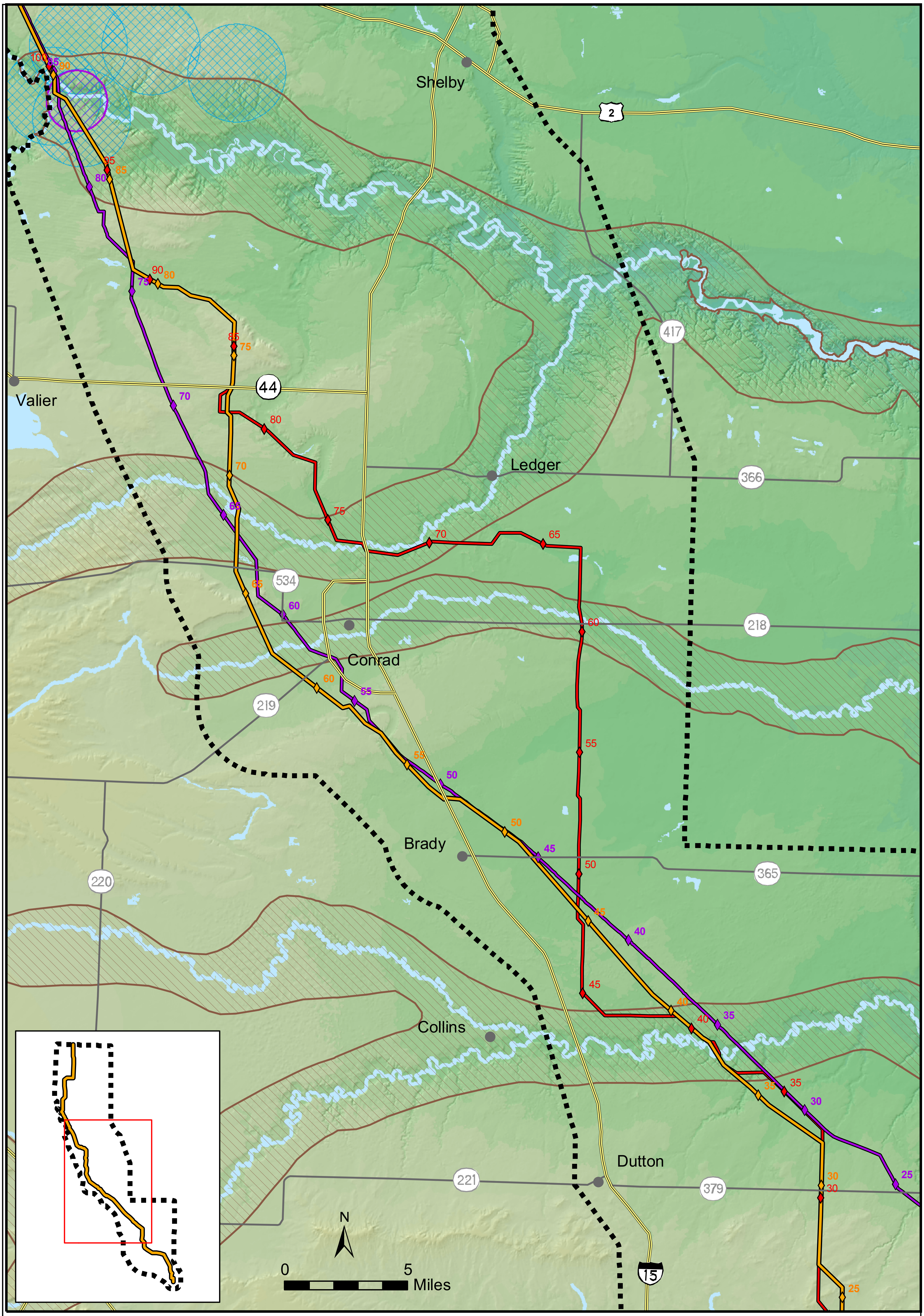


FIGURE 3.8-2
PROPOSED MATL POWERLINE MULE DEER WINTER RANGE AND SPECIES OF SPECIAL CONCERN MIDDLE

LEGEND

- MULE DEER WINTER RANGE (MTFWP)
- BLACK-CROWNED NIGHT-HERON (*Nycticorax nycticorax*)
- BLACK-NECKED STILT (*Himantopus mexicanus*)
- BURROWING OWL (*Athene cunicularia*)
- FERRUGINOUS HAWK (*Buteo regalis*)
- PEREGRINE FALCON (*Falco peregrinus*)
- SHARPTAIL GROUSE LEKS PROTECTION BUFFER AREA
- ALT2 - ALIGNMENT
- MILE MARKERS
- ALT3 - ALIGNMENT
- MILE MARKERS
- ALT4 - ALIGNMENT
- MILE MARKERS
- CITIES AND TOWNS
- ALIGNMENT END AND EXIT POINTS
- STUDY_AREA
- MAJOR_HIGHWAYS
- SECONDARY_ROADS
- RIVERS AND STREAMS

GIS map by Patricia Williams -TTMTI 3-8-2-MuleDeerWinterRng-Middle.mxd

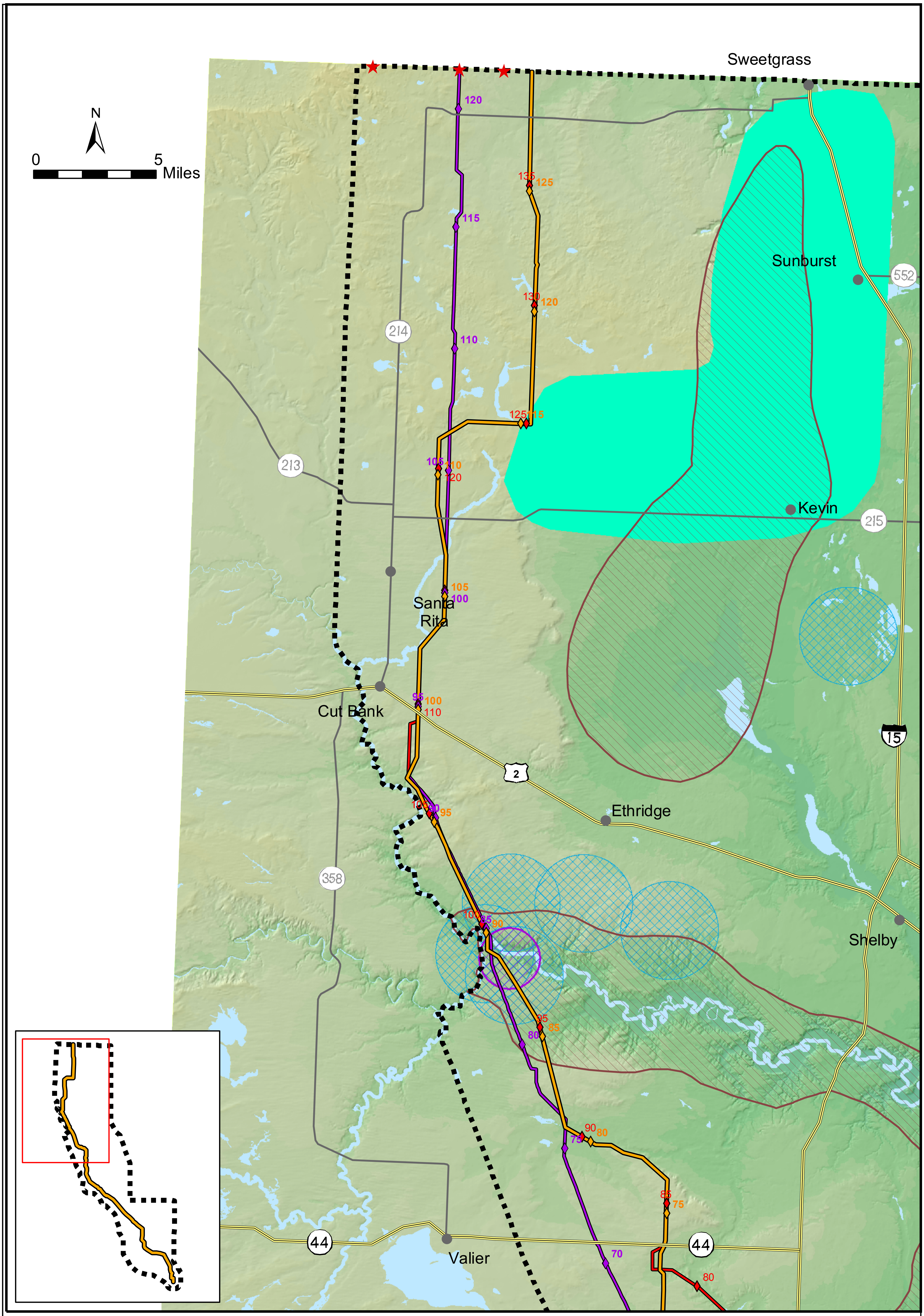


FIGURE 3.8-3
PROPOSED MATL POWERLINE
MULE DEER WINTER RANGE AND SPECIES OF SPECIAL CONCERN
NORTH

LEGEND

- MULE DEER WINTER RANGE (MTFWP)
- BLACK-CROWNED NIGHT-HERON (Nycticorax nycticorax)
- BLACK-NECKED STILT (Himantopus mexicanus)
- BURROWING OWL (Athene cunicularia)
- FERRUGINOUS HAWK (Buteo regalis)
- PEREGRINE FALCON (Falco peregrinus)
- SHARPTAIL GROUSE LEKS PROTECTION BUFFER AREA
- ALT2 - ALIGNMENT
- MILE MARKERS
- ALT3 - ALIGNMENT
- MILE MARKERS
- ALT4 - ALIGNMENT
- MILE MARKERS
- CITIES AND TOWNS
- ALIGNMENT END AND EXIT POINTS
- STUDY_AREA
- MAJOR_HIGHWAYS
- SECONDARY_ROADS
- RIVERS AND STREAMS

GIS map by Patricia Williams -TTMTI 3-8-3-MuleDeerWinterRng-North.mxd

Bats

The Project area is within the known range of eight species of bats, representing one family and five genera (**Table 3.8-2**). All are insectivorous, preying upon nocturnal insects using highly evolved echolocation and foraging behavior. Bats use grasslands and riparian areas as foraging habitat. Some species are migratory, flying south for the winter (for example, the hoary bat and silver-haired bat), while others flock to local caves or mines for the lengthy winter hibernation (for example, Myotis spp. and the big brown bat). Migratory and wintering habits are poorly understood for many species. Townsend's big-eared bat is classified as a sensitive species by BLM and has a State rank of S2. The NHP did not have element occurrence data for this particular species of concern within the Project area.

TABLE 3.8-2
BAT SPECIES LIKELY TO OCCUR IN THE PROJECT AREA[a]

Common Name	Scientific Name	Roosting Habitat[b]	Status[c]	Migration[d]
Silver-haired bat	*Lasionycteris noctivagans*	Tree cavities in mature coniferous/mixed forest	C	Migratory
Hoary bat	*Lasiurus cinereus*	Trees	C	Migratory
Big brown bat	*Eptesicus fuscus*	Tree cavities, buildings	C	Not known
Townsend's big-eared bat	*Corynorhinus townsendii*	Caves, abandoned mines	U	Year-round resident
Western small-footed myotis	*Myotis ciliolabrum*	Caves, abandoned mines, rock crevices	U	Not known
Long-eared myotis	*Myotis evotis*	Tree cavities and exfoliating bark in mature conifers	U	Not known
Little brown myotis	*Myotis lucifugus*	Buildings, trees, rock crevices	C	Probably migratory
Long-legged myotis	*Myotis volans*	Trees, buildings, rock crevices	U	Probably migratory

Notes:

Source: MATL 2006b

a Based upon NHP distribution data
b Primary hibernacula and roost habitats used by the species (Bat Conservation International 2002).
c General abundance/distribution in North America: C= common, U=uncommon (Bat Conservation International 2002).
d Current knowledge of migration status (Genter and Jurist 1995).

Due to local geologic and physiographic conditions, few if any caves or abandoned mines occur in the Project area. Rock faces/crevices are found sparingly along parts of the Marias River and along the Kevin Rim. Accordingly, Townsend's big-eared bat and western small-footed myotis are unlikely to roost in the Project area. Furthermore, the Project area is at the distributional limits for these species, and suitable roosting habitat does not exist in the area, thus the potential for occurrence of these species is relatively low. In addition, the only known location of Townsend's big-eared bat north of the Missouri River in northeastern Montana is in the Little Rocky Mountains approximately 130 miles to the east (Hendricks 2000).

The cottonwood stands along the Marias River and Teton River represent potential roosting habitat for those species that roost in tree cavities and exfoliating bark. These species may occur in low densities given the limited availability of forested habitats within the Project area. Habitat generalists, such as the big brown bat, little brown myotis or the long-legged myotis, are likely to be the most abundant bat species in the area given their capacity to use both natural and man-made structures for day and night roosts. No roosts or hibernacula are known to occur in the vicinity of the Project area.

3.8.2.2 Birds

The vegetative communities provide habitat for a number of migratory and resident bird species within the Project area. These species can generally be classified as upland game birds, grassland birds, waterfowl and shore birds, and raptors. The Marias River and Teton River cottonwood stands represent the only large tracts of relatively contiguous forests in the Project area and provide potential habitat for bird species that use forested and riparian habitats. The prairie grasslands along the river breaks and coulees provide potential habitat for a number of obligate grassland species. The five WPAs, Benton Lake NWR, and various prairie potholes provide potential habitat for waterfowl and shore birds.

Upland Game Birds

Upland game bird species known to occur in the Project area include: the ring-necked pheasant, the gray (Hungarian) partridge, and the sharp-tailed grouse. Ring-necked pheasant and gray partridge habitat consists of a mosaic of open grasslands, cropland, and brushy cover. Extensive tracts of prairie grassland do not provide good pheasant habitat (Mussehl and Howell 1971). Pheasants occur throughout the Project area, but primarily within the vicinity of waterways.

Although the greater sage grouse (*Centrocercus urophasianus*) is classified as sensitive by the BLM and sharp-tailed grouse is considered uncommon by the State, they are currently considered game species by FWP and are subject to a legal harvest season. Generally, the greater sage grouse is a sagebrush obligate that relies on big sagebrush habitats in all seasons. Due to the low occurrence of big sagebrush habitat (see Section 3.7.2), distribution data indicate that sage grouse do not occur within the Project area. The closest distribution of sage grouse is near Tiber Reservoir along the Marias River, approximately 30 miles east of the study area.

Sharp-tailed grouse inhabit grasslands interspersed with woody draws and shrub coulees. The entire Project area contains potential habitat for sharp-tailed grouse (Montana NRIS 2005). Except for areas close to the Marias River, Teton River, and Benton Lake NWR, the Project area contains lower quality sharp-tailed grouse habitat due to habitat loss and fragmentation associated with agricultural activities. During field investigations a total of seven sharp-tail leks (courtship display areas) were recorded. Three of the leks were observed visually and four leks were only identified by sound. Although FWP did not have specific locations of leks, it identified water crossings, draws, and coulees that are not cultivated as probable locations for leks within the Project area, specifically Benton Lake NWR, Cut Bank Creek breaks (including where the Two Medicine River and Cut Bank Creek come together to form the Marias River), Teton River, east of Dutton along coulees and draws, Big Flat Coulee, the Dry Fork of the Marias River, and the Kevin Rim (Olson 2005a).

Grassland Birds

The intact mid- and shortgrass prairie communities along the Marias River, Teton River, and several draws and coulees within the Project area have been subjected to light to moderate grazing intensities and represent relatively high quality wildlife habitat. Several obligate grassland species may potentially occur in the aforementioned areas. FWP identified the following grassland birds as having the potential to occur:

- McCown's longspur (*Calcarius mccownii*);
- Mountain plover (*Charadrius montanus*);
- Sprague's pipit (*Anthus spragueii*);
- Chestnut collared longspur (*Calcarius ornatus*); and
- Baird's sparrow (*Ammodramus bairdii*).

None of the aforementioned species was observed during field investigations. All five of these species are identified by the state as species of concern. Baird's sparrow was identified by the NHP as known to occur within the Project area and is discussed further in Section 3.10. The quality and relative intactness of the grassland prairie habitats declines with distance away from the Marias and Teton rivers due to increasing agricultural land uses.

Waterfowl and Shore Birds

Several waterfowl species are known to occur in the Project area, the majority of which have been observed on Benton Lake NWR (**Figure 3.6-1**). Breeding bird surveys on Benton Lake NWR have documented 20 species of ducks, including 12 species that stay to nest on the refuge (FWS 2000). These species likely use areas adjacent to the refuge for foraging. Birds have been documented to migrate into the refuge from all directions and no specific migratory pathways or low-level flight feeding pathways have been identified (Johnson 2005). Waterfowl habitat within the Project area includes wetlands, stock ponds, the Marias River, and the Teton River. Wetlands and stock ponds tend to be small and isolated. Since most stock ponds lack emergent and/or wetland vegetation, nesting habitat is limited. Surface waters that possess potential nesting habitat include Benton Lake, Hay Lake, Grassy Lake, five WPAs, and a few of the larger, undisturbed prairie potholes. The Marias and Teton rivers also provide waterfowl habitat, although hydrological changes and channel incision have reduced the availability of quality nesting habitat along both rivers. Riparian communities along ephemeral streams that bisect the Project area do not provide quality waterfowl habitat. Wetlands, stock ponds, Hay Lake, Marias and Teton rivers, and Benton Lake NWR also provide stopover habitat for migrating waterfowl.

Approximately 32 species of shore birds are known to occur in the Project area, primarily on Benton Lake NWR (**Table 3.8-3**). These species nest in native grassland prairie habitats in proximity to mesic grasslands or shallow wetlands. Habitat for these species occurs primarily in the northern and central portions of the Project area where native prairie grasslands are interspersed with small ponds, wetlands, and riparian areas. Habitat for other shore bird species includes the wetlands and stock ponds that are dispersed throughout the Project area. With the exception of Hay Lake, the small size and lack of emergent wetland vegetation in most of the water bodies reduces their quality as shore bird habitat. The Marias and Teton rivers and adjacent areas also represent potential shore bird habitat.

TABLE 3.8-3
WATERFOWL AND SHORE BIRDS SIGHTED ON BENTON LAKE NWR SINCE 1961

Shore birds	Swans, Geese, and Ducks
Black-bellied Plover	Tundra Swan (Whistling Swan)
American Golden Plover (Lesser Gol-Pl.)	Trumpeter Swan
Semi-palmated Plover	Greater White-fronted Goose
Piping Plover	Snow Goose
Killdeer	Ross' Goose
Black-necked Stilt	Canada Goose
American Avocet	Wood Duck
Greater Yellowlegs	Green-winged Teal
Lesser Yellowlegs	American Black Duck
Solitary Sandpiper	Mallard
Willet	Northern Pintail
Spotted Sandpiper	Blue-winged Teal
Upland Sandpiper	Cinnamon Teal
Whimbrel	Northern Shoveler
Long-billed Curlew	Gadwall

TABLE 3.8-3 (Continued) WATERFOWL AND SHORE BIRDS SIGHTED ON BENTON LAKE NWR SINCE 1961	
Shore birds	**Swans, Geese, and Ducks**
Hudsonian Godwit	Eurasian Wigeon
Marbled Godwit	American Wigeon
Ruddy Turnstone	Canvasback
Red Knot	Redhead
Sanderling	Ring-necked Duck
Semipalmated Sandpiper	Greater Scaup
Western Sandpiper	Lesser Scaup
Least Sandpiper	Oldsquaw
Baird's Sandpiper	White-winged Scoter
Pectoral Sandpiper	Common Goldeneye
Dunlin	Barrow's Goldeneye
Stilt Sandpiper	Bufflehead
Short-billed Dowitcher	Hooded Merganser
Long-billed Dowitcher	Common Merganser
Common Snipe	Red-breasted Merganser
Wilson's Phalarope	Ruddy Duck
Red-necked Phalarope	

Note:

Source: MATL 2006b

Raptors

A number of raptor species are known to occur in the Project area and have been observed during breeding bird surveys and field investigations conducted for this project. The Kevin Rim Area of Critical Environmental Concern and the Marias River breaks provide potential habitat for raptors. A list of raptors observed by other researchers along Kevin Rim from 1993-1994 is presented in **Table 3.8-4** (Zelenak 1996).

While these species are present in the Project area during breeding season, potential nesting sites, aside from Kevin Rim and the bluffs around the Marias River, are limited to small shrubs in draws and coulees, riparian cottonwood trees, and ornamental spruce trees near farms or residential areas (Olson 2005a). A historic peregrine falcon eyrie is located where Cut Bank Creek and Two Medicine River flow together to form the Marias River. The eyrie is discussed further in Section 3.10. Intermittent cottonwood stands along the Marias and Teton rivers are used by bald eagles during the winter, and indirect evidence of breeding has been observed in these areas (NHP 2005). Bald eagles and peregrine falcons are often seen in the spring on Benton Lake NWR (FWS 2000).

TABLE 3.8-4 RAPTORS OBSERVED AT THE KEVIN RIM, 1993-1994[a]	
Common Name	**Scientific Name**
Ferruginous hawk	*Buteo regalis*
Prairie falcon	*Falco mexicanus*
American kestrel	*Falco sparverius*
Red-tailed hawk	*Buteo jamaicensis*
Golden eagle	*Aquila chrysaetos*
Swainson's hawk	*Buteo swainsoni*
Great-horned owl	*Bubo virginianus*
Burrowing owl	*Athene cunicularia*
Northern harrier	*Circus cyaneus*
Short-eared owl	*Asio flammeus*

Notes:
Source: MATL 2006b
[a] Source: Zelenak 1996

Potential raptor prey sources include colonial rodents, lagomorphs, waterfowl, young grouse, and carrion. Although prey populations in the Project area have not been assessed, prey densities are generally low (Olson 2005a). Ground squirrels comprised the majority of prey items recorded in ferruginous hawk nests in 1993 and 1994, followed by lagomorphs and birds (Zelenak 1996). A black-tailed prairie dog town is known to exist east of Interstate 15 southeast of Shelby north of the Marias River. Rabbits and hares are common and, while these populations are subject to large annual fluctuations, field investigations indicated that current lagomorph densities are relatively low. The five WPAs provide waterfowl concentration areas, which may serve as raptor prey sources. Carrion is available on ungulate winter ranges where bald eagles and other scavengers are attracted to the area by over-winter mortalities (Olson 2005a). Dead livestock may also provide carrion for scavenging raptors.

Migratory Birds

The Project area contains rolling hills, gentle ridges, and plateaus bisected by small drainages. There are no obvious "funnels," such as prominent ridgelines or mountain gaps that could potentially serve as a large scale or regional migratory pathway. The relatively small ridges within the Project area may serve as local pathways for birds passing through as part of a large, broad front migration. Thousands of tundra swans, and snow and Ross' geese stop at the Benton Lake NWR for a week or more on their migration from their wintering grounds in central California to nesting areas in arctic Alaska and Canada. Twenty species of ducks, including 12 species that stay to nest on the Refuge, also migrate through this area. Aside from Benton Lake NWR, a limited amount of stopover habitat for migrating waterfowl is available within the Project area (Johnson 2005). Riparian habitats can also provide stopover habitat for neotropical migrants. Examples of neotropical migrant birds include species of plovers, terns, hawks, cranes, warblers, and sparrows.

3.8.2.3 Reptiles and Amphibians

Although fragmented by agricultural cropland, the upland, riparian, and aquatic communities within the Project area may provide habitat for a variety of reptile and amphibian species. Field surveys were not conducted specifically for reptiles and amphibians during the spring and summer 2005; however, species distribution information suggests that 10 reptile and amphibian species are likely to occur in the Project area (FWS 2000). **Table 3.8-5** presents a list of reptiles and amphibians that are likely to occur based upon observations of habitat during field investigations, the Benton Lake NWR wildlife list, previous NHP field studies, and the NHP Animal Field Guide database. The greater short-horned lizard is classified as a sensitive species by BLM and has a State rank of S3. The NHP did not have element occurrence data for this particular species of concern within the Project area. The species listed in **Table 3.8-5** occupy a broad range of habitat types, ranging from ponds to mesic grasslands to xeric uplands, and may occur in appropriate habitats throughout the Project area. No known critical breeding habitats or hibernacula for any reptile or amphibian species occur within the Project area.

3.8.3 Environmental Impacts

For impacts of alternatives, the analysis focuses on assemblages of species that are of concern for reasons of public importance, sensitivity to disturbance, or regulatory issues. Potential impacts were determined mainly based upon the habitat type crossed, and the known (that is, mule deer winter range) or potential (that is, sharp-tailed grouse leks) sensitive wildlife resources within that habitat type. Short-term direct impacts on wildlife resources would include loss of individuals during construction or direct disturbance of species during critical periods in their life cycles. Long-term direct impacts could include alteration and/or fragmentation of habitat, electrocutions, and collisions. Indirect impacts could include fragmentation and disturbance caused by providing access to areas not previously accessible.

3.8.3.1 Alternative 1 – No Action

Under the No Action alternative, the proposed Project would not be implemented. Existing electrical transmission service would be maintained and operated at its current level. Selection of the No Action alternative would not result in any construction or operations of additional transmission lines within the project area; thus, no impacts to wildlife or their habitat would occur.

TABLE 3.8-5 REPTILE AND AMPHIBIAN SPECIES LIKELY TO OCCUR IN THE ANALYSIS AREA[a] MONTANA ALBERTA TIE LTD., LETHBRIDGE, AB – GREAT FALLS, MT		
Common Name	**Scientific Name**	**Habitat**
Reptiles		
Short-horned lizard[b]	*Phrynosoma hernandesi*	Sparse, short grass and sagebrush habitats with exposed soils or rock
Racer	*Coluber constrictor*	Open habitats, particularly common in short-grass prairie
Gopher snake	*Pituophis catenifer*	Arid sagebrush and grassland habitats
Western Rattlesnake	*Crotalus viridis*	Open, arid habitats with south-facing slopes and rock outcrops
Common Garter Snake	*Thamnophis sirtalis*	Numerous, prefer moist habitats along streams and ponds
Western Terrestrial Garter Snake	*Thamnophis elegans*	Nearly all habitats
Plains Garter Snake	*Thamnophis radix*	Numerous, including short-grass prairie near water (ponds and coulees)
Amphibians		
Tiger Salamander	*Ambystoma tigrinum*	Breeds in ponds and streams; burrows in prairie or agricultural habitats
Western Chorus Frog	*Pseudacris triseriata triseriata*	Mesic grasslands and marshes near ponds and small lakes
Painted Turtle	*Chrysemys picta*	Lakes, ponds, reservoirs, and sloughs that contain some shallow water areas and a soft bottom; also river backwaters and oxbows with little current

Notes:
Source: MATL 2006b
[a] Source: NHP 2004.
[b] BLM: Sensitive; State rank: S3 - potentially at risk because of limited and/or declining numbers, range, and/or habitat, even though it may be abundant in some areas.

3.8.3.2 Alternatives 2, 3, and 4 – Action Alternatives

Potential adverse impacts on wildlife associated with development of the transmission line can be separated into impacts associated with project construction (short term) and those related to operations and maintenance (long term). The primary potential impacts include direct mortality, habitat loss and fragmentation, disturbance and displacement of individual animals, interference with behavioral activities, and disturbance resulting from increased public access.

Short-term Impacts

Installation and development of the proposed transmission line could cause direct injury or mortality to wildlife species within the Project area. Activities such as site clearing and grading, construction of access roads and support facilities, and off-road travel during construction could impact wildlife species. Species with higher likelihood to be impacted would include species with limited mobility, species that burrow, or avian species, as nests/burrows could be destroyed during project construction. Construction related disturbances would be short term (6 to 7 months) and confined to the construction site or adjacent storage areas.

Disturbance associated with the installation and development of the transmission line would result in some habitat loss and fragmentation. Project construction activities such as site clearing, site grading, and development of access roads and support facilities would result in a temporary loss of approximately 38 to 48 acres of potential habitat for species within the Project area, depending on the action alternative (MATL 2006b). While a portion of disturbed areas would be reclaimed upon completion of construction activities, permanent habitat loss would occur within the footprints of support structures, and access roads.

Project construction activities would result in disturbance and behavioral interference. Noise, fugitive dust, and activities associated with site clearing and grading, installation of support structures, construction of access roads and support facilities, and associated equipment could disturb and displace wildlife within and adjacent to impact areas. All wildlife species within or near impact areas would be susceptible to disturbance and disturbance would have the greatest impact during migration and breeding seasons. Some species with small home ranges or limited dispersal ability might experience a greater impact. These disturbances would be short term (6 to 7 months) and concentrated within the activity area.

The project construction activities could also result in accidental exposure to contaminants or fire, or increased legal and illegal killing of wildlife. Accidental spills during equipment maintenance or refueling could result in temporary exposure to hazardous contaminants. However, spill prevention plans would be in place and impacted areas would be immediately reclaimed. In addition, exposure would be temporary and restricted to the site of spill; thus, impacts on wildlife would be unlikely. Accidental fires associated with construction and maintenance vehicles would result in the temporary loss of habitat. The increased public access as a result of increased access roads may result in additional legal hunting and poaching. However, this is not expected to increase the level of hunting in the region, only potentially increase access.

Long-term Impacts

Collisions

Direct impacts to avian species could occur as a result of collisions with the proposed transmission line. Operation of the proposed transmission line would have the greatest impact on bird species, due to the collision threat posed by structures, transmission lines, and ground wires. Most other wildlife would not be as impacted, since the presence of the transmission line, structures, and access roads generally do not present barriers to migration, create excessive noise, or otherwise cause major behavior changes.

A variety of factors influence avian transmission line collisions: configuration and location of transmission lines; specific avian species and their tendency to collide with transmission lines; and the environment, such as weather, topography, and habitat (Avian Power Line Interaction Committee [APLIC] and FWS 2005). Line placement with respect to other structures and topography can influence the collision rate of a transmission line. Collisions usually occur near water or migration corridors and more often during inclement weather. Less agile birds, such as heavy-bodied birds or birds within flocks, are more likely to collide with overhead lines as they lack the ability to quickly negotiate obstacles. Some bird species, usually waterfowl, are prone to collisions with power lines, especially the grounding wires located at the top of the structures (Meyer 1978, James and Haak 1979, Beaulaurier 1981, Beaulaurier et al. 1982, Faanes 1987). Raptor species are less likely to collide with power lines, perhaps due to their excellent eyesight and tendency to not fly at dusk or in low visibility weather conditions (Olendorff et al. 1981). Smaller migratory birds are at risk, but generally not as prone to collision because of their small size, ability to quickly maneuver away from obstacles, and because they often migrate high enough above the ground to avoid transmission lines. Permanent-resident birds that fly in tight flocks, particularly those in and near wetland areas, may be at higher risk than other species.

The action alternatives would implement environmental protection measures that would reduce the potential for avian collisions. Areas with a higher likelihood for avian collisions, such as known flyways, were avoided. In addition, MATL would apply *Suggested Practices for Raptor Protection on Power Lines*, developed by the EEI and APLIC (1996), as appropriate, during design and construction of overhead structures and the substation additions. Avian collisions would be reduced as approved line marking devices would be installed every 50 feet on overhead ground wires within all stream, river and wetland crossings, such as crossings of the Marias River, the Dry Fork Marias River, Teton River, east of the Benton Lake NWR boundary. Line marking devices would also be placed every 50 feet within a ¼ mile buffer on either side of streams, rivers, or wetlands. Monitoring of potential problem areas after construction would ensure that line markers are functioning properly.

Electrocutions

New transmission lines could potentially impact large birds, such as raptors through electrocution. Electrocution occurs when birds with large wingspans come in contact with either two conductors or a conductor and a grounding device. Two factors influence the potential for avian electrocution: environmental factors such as topography, vegetation, available prey and behavioral factors; and inadequate separation between energized conductors and grounded hardware can provide two points of contact (APLIC and FWS 2005). MATL transmission line design standards provide adequate spacing to eliminate the risk of raptor electrocution. MATL's line would entail "avian- safe" structures, which provide adequate clearance to accommodate a large bird between energized and/or grounded parts. These structures typically have 60 inches of horizontal separation, which can accommodate the wrist-to-wrist distance of an eagle. In addition, vertical separation of at least 48 inches can accommodate the height of an eagle from its feet to the top of its head (APLIC and FWS 2005).

Increased Predation

Impacts as a result of the proposed transmission line could occur from increased raptor predation within the areas surrounding the support structures. In areas where suitable prey habitat is within view, perch sites can provide an energy efficient method for hunting. There is the concern that raptors may use the horizontal cross arms of H-frame transmission structures or single pole structures as perches while scouting for food. Concerns have been raised in some circumstances that the raptors could impact the prairie nesting bird populations due to this. The proposed segments do not go through any major prairie bird nesting area and the segments that have been identified to come within 2 miles of an identified lek would have perch guards installed on support structures in order to deter raptor perching. The 2-mile radius has been identified by FWP biologists (Northrup 2006) and peer reviewed management guidelines (Connely et al. 2000) as an adequate buffer area to ensure that leks would be protected from an increase in raptor predation.

Impacts to Species Assemblages

All action alternatives would cross through similar habitat types with predominantly agricultural lands and scattered grasslands. Impacts to specific assemblages of wildlife species are discussed below. Because only minor differences occur between the action alternatives, impacts are discussed together with differences addressed within the discussion.

Big Game Species

Impacts on big game species would not be expected. Pronghorn and mule deer does with fawns could be displaced by activities during late spring and early summer, but disturbance within a given portion of the line would be temporary and animals could easily use adjacent habitat during disturbance periods. Activities would not disturb wintering animals as the construction activities would occur during the spring and summer months. In the event that activities would occur within the winter months, animals could be disturbed and potentially displaced; however, disturbance within a specific area would be temporary. The proposed and alternative transmission line alignments would cross through mule deer winter range and there would be some permanent loss of habitat as a result of structures and access roads (see **Table 3.8-6).**

This habitat loss would not impact mule deer as this is a minor loss relative to the amount of available habitat within the region.

TABLE 3.8-6
MULE DEER WINTER RANGE IMPACTED BY ALTERNATIVES

Mule Deer Winter Range	Alternative		
	2	3	4
Linear Miles of Mule Deer Winter Range Bisected by Transmission Line	19	20	28

Sharp-tailed Grouse

Potential sharp-tailed grouse habitat along alternative alignments is patchy due to fragmentation by agricultural land. The primary suitable habitat is within the grasslands above the Marias River where two leks were observed and two leks were identified by sound. In total, three leks are within the 2-mile buffer area of the alignments. Although no leks were observed above the Teton River during field investigations, the area where the action alternatives would cross the Teton is potential sharp-tailed grouse habitat.

Impacts on sharp-tailed grouse leks could potentially result from disturbance during the breeding season in April and early May, and to nesting hens during May and early June. However, based on MATL's commitment to curtail construction in any sharp-tailed grouse nesting habitat during the nesting season and to use raptor perch deterrents as appropriate, few impacts to breeding sharp-tailed grouse would occur from implementation of the alternatives. Based on consultation with the FWP (Northrup 2006) and the "Guidelines for management of sage grouse populations and habitats" (Connely at al. 2000), all support structures that would cross within the 2-mile buffer area around the documented leks would be fitted with raptor perch deterrents to reduce predation. For all action alternatives, this would result in approximately 73 support structures (11 miles of transmission line) to be fitted with raptor perch deterrents.

Raptors

Raptor nest surveys conducted along the action alternative alignments showed no raptor nests occurring within one-half mile of the alignments. Nesting habitat occurs in cottonwood groves found along the Marias and Teton rivers and in ornamental trees found near residences, generally greater than 1 mile away from the alignments (Olson 2005b). Impacts to raptors would not be expected and, in the event that a raptor nest was identified during construction activities, MATL would consult with the FWP and take precautions to minimize impacts on nesting raptors.

Migratory Birds

Disturbance to migratory birds from noise, vehicles, and human presence during construction would be localized and of short duration. Bird nests could be destroyed if birds are nesting within the disturbed areas. However, many of the birds would re-nest if the first attempt were unsuccessful. No long-term impacts associated with operating and maintaining the line would occur.

Wetlands are an essential component of waterfowl nesting habitat and nesting can occur up to a mile from wetlands (Ringelman 1992). Alternative alignments would not come within 1 mile of any of the five WPAs or any known nesting colonies in the Project study area. Peterson WPA, located in Glacier County northwest of Hay Lake, is approximately 1.7 miles from the Alternative 2 alignment and 1.4 miles from the Alternative 3 alignment. Nesting colonies of white pelicans, great blue herons, or double-crested cormorants are not known to occur within a one-mile buffer area of any of the alternative alignment (Olson 2005b and Johnson 2005). Waterfowl nesting tends to be concentrated within uplands adjacent to wetlands (Ringelman 1992), thus, the construction and operation of the transmission line would not impact waterfowl nesting associated with the WPAs.

The alignments cross land to the east and west of Benton Lake NWR. Alternative 2 and 4 routes are approximately 0.9 mile away from Benton Lake, while Alternative 3 is 0.8 mile away. Birds approach Benton Lake NWR during spring and fall migration.

3.9 Fish

3.9.1 Analysis Methods

The following section discusses the occurrence and distribution of fish species within the Project area. Threatened, endangered, candidate, and sensitive fish species found within the Project area are discussed in Section 3.10.

Analysis Area

The analysis area includes all fish bearing waterways within the MFSA application Project study area (**Figure 1.1-1**). These waterways include: the Missouri River, the Marias River, the Teton River and their associated tributaries, and several man-made stock ponds and reservoirs.

Information Sources

Information on fisheries within the Project area was obtained from a variety of sources, including: literature review, reports from the NHP and FWP, technical reports and peer-reviewed journal articles. Species lists, valuable information, and mapping of sensitive species and important habitats were obtained through meetings and correspondence with personnel from the FWS and FWP (MATL 2006b).

3.9.2 Affected Environment

The Project area crosses one sub-basin of the Milk Watershed and seven sub-basins of the Marias Watershed. The sub-basins crossed are: Upper Missouri-Dearborn Rivers, Sun River, Teton River, Marias River, Two Medicine River, Willow Creek, and Cut Bank Creek sub-basins in the Marias Watershed and the Upper Milk River sub-basin in the Milk Watershed. The only water body identified by the FWP as a blue ribbon or red ribbon river in the Project area is the Missouri River. The river miles at which all three alternatives cross the Marias and Teton rivers are considered Habitat Class 3 and Sport Class 4 fisheries.

Several intermittent gulches, coulees, creeks, and rivers cross the Project area. The majority of the water bodies act as tributaries to three major rivers within the Project area: the Marias River, the Teton River, and the Missouri River. Both the Marias and Teton rivers drain into the Missouri River.

The gulches and coulees within the Project area are typically dry during the summer and do not support fisheries. Lakes are predominately man-made stock ponds, reservoirs, or prairie potholes. Water bodies and lakes that hold water year-round are generally capable of supporting both warm-water and cold-water fish species. A list of fish species known to occur within the Project area is presented in **Table 3.9-1.**

TABLE 3.9-1
FISH SPECIES KNOWN TO OCCUR WITHIN THE PROJECT AREA

Game Fish		Rough Fish/Non-Game Fish		Forage Fish	
Common Name	*Scientific Name*	*Common Name*	*Scientific Name*	*Common Name*	*Scientific Name*
Brown Trout	*Salmo trutta*	Common Carp	*Cyprinus carpio*	Emerald Shiner	*Notropis atherinoides*
Brook Trout	*Salvelinus fontinalis*	Bigmouth Buffalo	*Ictiobus cyprinellus*	Fathead Minnow	*Pimephales promelas*
Rainbow Trout	*Oncorhynchus mykiss*	Freshwater Drum	*Aplodinotus grunniens*	Flathead Chub	*Platygobio gracilis*
Burbot	*Lota lota*	River Carpsucker	*Carpiodes carpio*	Lake Chub	*Couesius plumbeus*
Channel Catfish	*Ictalurus punctatus*	Shorthead Redhorse	*Moxostoma macrolepidotum*	Longnose Dace	*Rhinichthys cataractae*
Northern Pike	*Esox lucius*	Smallmouth Buffalo	*Ictiobus bubalus*	Longnose Sucker	*Catostomus catostomus*
Shovelnose Sturgeon	*Scaphirhynchus platorynchus*	Golden Trout	*Oncorhynchus mykiss aguabonita*	Mottled Sculpin	*Cottus bairdi*
Walleye	*Sander vitreus*	Paddlefish S1, S2	*Polyodon spathula*	Mountain Sucker	*Catostomus platyrhynchus*
Yellow Perch	*Perca flavescens*	--	--	--	--
Smallmouth Bass	*Micropterus dolomieu*	--	--	White Sucker	*Catostomus commersoni*
Mountain Whitefish	*Prosopium williamsoni*	--	--	Goldeye	*Hiodon alosoides*
Sauger S2	*Sander canadensis*	--	--	Plains Minnow	*Hybognathus placitus*
Sauger X Walleye Hybrid	--	--	--	Blue Sucker S2, S3	*Cycleptus elongatus*
--	--	--	--	Spottail Shiner	*Notropis hudsonius*
--	--	--	--	Western Silvery Minnow	*Hybognathus argyritis*
--	--	--	--	Sturgeon Chub S2	*Macrhybopsis gelida*
--	--	--	--	Stonecat	*Noturus flavus*
--	--	--	--	Cisco	*Coregonus artedi*

Notes:
Source: MATL 2006b and Montana Fisheries Information System Database (2005).
-- = not applicable
S1: Critically imperiled because of extreme rarity and/or other factors making it highly vulnerable to extinction.
S2: Imperiled because of rarity and/or other factors making it vulnerable to extinction.
S3: Vulnerable because of rarity, or found in restricted range even though it may be abundant at some of its locations.

3.9.3 Environmental Impacts

3.9.3.1 Alternative 1 - No Action

Under the No Action alternative, the proposed Project would not be implemented. There would be no construction activities or associated activities related to a new transmission line and existing electrical transmission service would be maintained and operated at its current level. This would result in no additional impacts to fish or their population within the Project area.

3.9.3.2 Alternatives 2, 3, and 4 – Action Alternatives

Since all action alternatives would entail the proposed transmission line crossing fish-bearing water bodies, and impacts on the water bodies would not vary substantially between alternatives, impacts to fish and their habitat for all action alternatives are addressed within this section.

Potential impacts on the fish-bearing water bodies center around several disturbance related issues, such as: an increase in sediment transport due to increased erosion from disturbed and newly exposed areas; degradation of water quality as a result of contaminants (that is, herbicides or petroleum products); increased temperatures within water bodies as a result of removed riparian and streamside vegetation; or direct impacts or disturbance to fish and their habitats. None of the alternative alignments closely parallel streams or lakes where fish are present. Most crossings of stream habitats are short.

Impacts related to increased erosion and sediment transport would be mitigated and reduced through the implementation of best management practices and environmental protection measures. An erosion control plan would be developed and implemented during construction. Erosion control measures, such as water bars, drainage contours, straw bales, and filter cloths would reduce erosion within disturbed areas and prevent sediment transport to water bodies. In addition, disturbed areas would be contoured and seeded after completion of construction activities, which would reduce erosion and sediment transport. Due to the implementation of the environmental protection measures, increased sediment within water bodies as a result of the action alternatives would likely not occur, and fish and their habitat would not be impacted.

Implementation of a spill prevention plan and environmental protection measures would ensure that water quality is protected from petroleum products and herbicides, and impacts on fish or their habitat would not likely occur.

Impacts on fish habitat as a result of the removal of streamside vegetation and increased water temperatures would not be expected to occur as a result of the implementation of the action alternatives. Structures would not be sited within fish-bearing water bodies and there would be little or no removal of streamside vegetation as a result of construction or related activities.

The structures for alternatives 2, 3, and 4 would not be sited within any water bodies and construction activities would not occur within water bodies that support fish populations. Implementation of the action alternatives would not impact any fish populations or species distribution.

3.10 Threatened, Endangered, and Candidate for Listing Species

3.10.1 Analysis Methods

Analysis Areas

This section addresses the current occurrence, distribution of, and potential impacts to species that are listed as threatened and endangered species under the Endangered Species Act (ESA), species that are candidates for listing, and those that have been proposed for listing. In addition, species with limited members or distribution as indicated by the NHP and the FWP also are discussed in this section. Only species in the Project area are discussed. Analysis areas for vegetation, wildlife, and fish are the same as described in Sections 3.7.1, 3.8.1, and 3.9.1.

Information Sources

Vegetation information sources are the same as described in Section 3.7.1. Wildlife and fish information sources are the same as described in Sections 3.8.1 and 3.9.1.

3.10.2 Affected Environment

3.10.2.1 Vegetation

Species of concern in Montana are those species that are at risk or potentially at risk due to a combination of rarity, restricted distribution, habitat loss, or other limiting factors (MATL 2006b). Within the Project area a variety of habitats could support species of concern. Five plant species of concern have been reported to occur within or adjacent to the Project area (**Table 3.10-1).** Of these species, two (both non-vascular) are historic records. The three vascular species documented in Glacier and Cascade counties are found in similar habitats: wet soils or shallow water around ponds and meadows along streams.

TABLE 3.10-1
PLANT SPECIES OF CONCERN REPORTED TO OCCUR WITHIN OR ADJACENT TO THE PROJECT AREA

Common Name	Scientific Name	State Rank	County	Habitat
Vascular Plants				
Many-headed Sedge	*Carex sychnocephala*	S1[a]	Glacier; Cascade	Found in moist soil of meadows along streams and ponds in the valleys and on the plains.
Long Sheath Waterweed	*Elodea longivaginata*	S1	Glacier	Found in shallow water of ponds and lakes on the plains.
Chaffweed	*Centunculus minimus*	S2[b]	Cascade	Found in vernally wet, sparsely vegetated soil around ponds and along rivers and streams in the valleys and on the plains.
Non-vascular Plants				
Entosthodon moss	*Entosthodon rubiginosus*	SH[c]	Cascade	This species is restricted to seasonally damp and alkaline, usually silt or clay-rich soil at the edges of ponds, lakes, and sloughs, and on seepage slopes in relatively dry environments.
American funaria moss	*Funaria americana*	SH	Cascade	Little information is available, however, it is thought that this species prefers limestone caves and cliffs.

Notes:

Source: MATL 2006b

[a] S1: Critically imperiled because of extreme rarity and/or other factors making it highly vulnerable to extinction.
[b] S2: Imperiled because of rarity and/or other factors making it vulnerable to extinction.
[c] SH: Historical, known only from records over 50 year ago; may be rediscovered.

3.10.2.2 Wildlife

Special status animal species reported to occur within or adjacent to the Project area by the NHP are listed in **Table 3.10-2.**

TABLE 3.10-2
SPECIAL STATUS WILDLIFE SPECIES REPORTED TO OCCUR WITHIN OR ADJACENT TO THE PROJECT AREA BY NHP

Common Name	Scientific Name	Status[a]		
		FWS	BLM	State
Burrowing Owl	*Athene cunicularia*	--	Sensitive	S2B
Ferruginous Hawk	*Buteo regalis*	--	Sensitive	S2B
Baird's Sparrow	*Ammodramus bairdii*	--	Sensitive	S2B
Black-necked Stilt	*Himantopus mexicanus*	--	--	S3 S4B
Black-crowned Night-heron	*Nycticorax nycticorax*	--	--	S3B
Peregrine Falcon	*Falco peregrinus*	--	Sensitive	S2B
Common Tern	*Sterna hirundo*	--	--	S3B
White-faced Ibis	*Plegadis chihi*	--	Sensitive	S1B
Franklin's Gull	*Larus pipixcan*	--	Sensitive	S3B
Black-tailed Prairie Dog	*Cynomys ludovicianus*	C	Sensitive	S3
Long-billed Curlew	*Numenius americanus*	--	Sensitive	S2B
Bald Eagle	*Haliaeetus leucocephalus*	T	--	S3B, S3N

Notes:

Source: MATL 2006b.

[a] FWS: PS = Partial status – status in only a portion of the species' range; LE = listed endangered; C = candidate; T =threatened; - - = not listed

BLM: Sensitive = either known to be imperiled and suspected to occur on BLM lands, suspected to be imperiled and documented on BLM lands, or needing further study for other reasons; -- = not listed

State:

B = a state rank modifier indicating breeding status for a migratory species;

N = non-breeding.

S1 = critically imperiled because of extreme rarity, or because of some factor of its biology making it especially vulnerable to extirpation;

S2 = Imperiled because of rarity, or because of other factors demonstrably making it very vulnerable to extinction throughout its range;

S3 = vulnerable because of rarity, or found in restricted range even though it may be abundant at some of its locations;

S4 = apparently secure, though it may be quite rare in parts of its range, especially at the periphery;

Ferruginous Hawk

A breeding population of approximately 20 pairs of ferruginous hawks was located in 1994 in the Kevin Rim and Buckley Coulee area in the northeastern and north-central portions of the Project area. NHP and FWP biologists indicate this species continues to breed along Kevin Rim (Olson 2005a). This area is a mix of privately owned land and state trust land in Toole County. Kevin Rim is a sandstone escarpment that runs approximately 8 miles, generally north-south, and faces east. The cliffs and adjacent badlands, grasslands, and draws host a very high density of raptor nests, primarily ferruginous hawks and prairie falcon. Section 3.10 discusses additional raptors that nest in the Kevin Rim area. Two biologists walked along approximately 3 miles of Kevin Rim in early May 2005 surveying for raptor nests. No nests and no raptors were observed at that time (MATL 2006b).

Ferruginous hawks also occur in and around Benton Lake NWR in Cascade, Chouteau, and Teton counties. The area is a mix of federally managed land (Benton Lake NWR), privately owned land, and state trust land. A breeding population of at least two pairs has been recorded within the Refuge. The full extent of occupied breeding habitat is unknown. The habitat of ferruginous hawks in Montana has been studied extensively and described as mixed-grass prairie, shrub-grasslands, grasslands, grass-sagebrush complex, and sagebrush steppe (NHP 2004).

Peregrine Falcon

An historical peregrine eyrie is known to occur on private land near the confluence of Cut Bank Creek and Two Medicine River where the Marias River forms in Glacier County. Eyries have a high potential for re-occupancy. It is unknown when peregrine falcons last occupied this eyrie. Peregrine falcons arrive in northern breeding areas in late April-early May and departure begins in late August-early September. Nests typically are situated on ledges of vertical cliffs, often with a sheltering overhang. Ideal locations include undisturbed areas with a wide view, near water, and close to plentiful prey. Substitute man-made sites can include tall buildings, bridges, rock quarries, and raised platforms (NHP 2004).

Black-tailed Prairie Dog

A black-tailed prairie dog town is located southeast of Shelby in Toole County north of the Marias River. This particular population is at the western extent of this species' known distribution (Olson 2005a). Prairie dog colonies are found on flat, open grasslands and shrub/grasslands with low, relatively sparse vegetation. The most frequently occupied habitat in Montana is dominated by western wheatgrass, blue grama, and big sagebrush. Colonies are associated with silty clay loams, sandy clay loams, and loams. Fine to medium textured soils are preferred, presumably because burrows and other structures tend to retain their shape and strength better than in coarse, loose soils. In Montana, colonies tend to be associated with areas heavily used by cattle, such as near water tanks and long-term supplemental feeding sites (NHP 2004).

Baird's Sparrow

Baird's sparrow nests and individual birds have been reported in Teton County on private land. The most recent data available are from the early 1990s. This species is more common east of the Continental Divide in Montana. The majority of observations of the species in the state occur at the earliest in May and the latest in July (NHP 2004). Baird's sparrows prefer to nest in native prairie, but structure may be more important than plant species composition. Nesting may take place in cultivated grasses (nesting has been observed in crested wheat, while smooth brome is avoided). This sparrow has also been found to use drier areas during unusually wet years, and wet areas during unusually dry years. Because a relatively complex structure is so important for nesting, areas with little to no grazing activity are required (NHP 2004).

Burrowing Owl

Burrowing owl nesting sites are known to occur on Benton Lake NWR in Cascade and Chouteau counties and also in Pondera County. Fledglings have been observed on at least two nest sites on the refuge. Burrowing owls are migratory in the northern portion of their range, which includes Montana. The extreme dates of observation for burrowing owls in Montana are, at the earliest, March and, the latest, October (NHP 2005). The majority of the spring reports for this species occur, however, in April with most fall observations in September (NHP 2004).

Burrowing owls are found in open grasslands, where abandoned burrows dug by mammals such as ground squirrels, prairie dogs and badgers are available. Black-tailed prairie dog and Richardson's ground squirrel (*Spermophilus richardsonii*) colonies provide the primary and secondary habitat for burrowing owls in the state. The burrows may be enlarged or modified, making them more suitable. Burrowing owls spend much time on the ground or on low perches such as fence posts or dirt mounds (NHP 2004).

Burrowing owl nesting site surveys were conducted in July 2005 to help assess utilization of the Project area by the species. With the guidance of a FWP biologist (Olson 2005a) surveys were focused north of the Marias River, north of Highway 2, and along the Kevin Rim. Point-count surveys were used to survey for burrowing owls in July 2005 (Conway and Simon 2003). Point-count survey routes were selected based on habitat and anecdotal observation information by landowners and the FWP biologist. At each survey point, the observer pulled the vehicle off the road, parked on the shoulder, exited the vehicle, and performed a 6-minute point-count survey listening for burrowing owl calls and scanning the surrounding landscape for owls using binoculars. While biologists did not observe any burrowing owls during field investigations, FWP biologists (Olson 2005b) and landowners have reported seeing this species within 1 mile of the proposed routes, north of Marias River.

Black-necked Stilt

Approximately 25 black-necked stilt nests were found in 1988 on Benton Lake NWR in Cascade, Chouteau, and Teton counties. This species continues to migrate to and nest on the refuge (Johnson 2005). Extreme migration dates in Montana are April, reported at Benton Lake NWR, and September, reported at Helena Valley Regulating Reservoir. In Montana, black-necked stilts nest in medium to large wetland complexes of open marshes and meadows, often in alkali areas.

Black-crowned Night-Heron

The first confirmed nesting of this species was in 1979, although records indicate presence of the birds as early as 1967 in the Benton Lake NWR area. The earliest records for Montana indicate arrival in April, with sightings throughout the summer months and extending into September, when most of the individuals begin their southerly movement. In 2000, one individual was found in the Chester area and stayed until October. Although highly adaptable to a variety of habitats, the black-crowned night-heron is likely to use shallow bulrush (*Scirpus* spp.) or cattail (*Typha* spp.) marshes, most often within a grassland landscape. In addition, they will also nest in cottonwoods, willows, or other wetland vegetation that allows them to nest over water or on islands that may afford them protection from mammalian predators. Most colonies are located in large wetland complexes, typically with a one-to-one ratio of open water and emergent vegetation (NHP 2004).

Common Tern

Approximately 75 common tern nests were found on Benton Lake NWR in 1988 and this species continues to nest on the refuge (Johnson 2005). The earliest migration date for common tern in Montana is in April, but the most concentrated arrival of birds occurs in May. Breeding has been recorded in May, June, and July, with fall departure beginning in late August and continuing into September. Nesting in Montana generally occurs on sparsely vegetated islands in large bodies of water. Nest substrate at these locations includes sandy, pebbly, or stony substrate, surrounded by matted or scattered vegetation (NHP 2004).

White-faced Ibis

Approximately 15 white-faced ibis nests were found in 1988 on Benton Lake NWR. The number and location of this species' nests on the refuge vary greatly from year to year. It is reported that the white-faced ibis often nests with the black-crowned night heron. White-faced ibises usually leave their wintering grounds in late March to early April. The earliest white-faced ibis observation in Montana was at Lee Metcalf NWR in March, but the most concentrated arrival in Montana occurs in May. In Montana, most begin their southern movement in August, and by September they are usually gone from the state (NHP 2004).

The white-faced ibis breeding habitat is typically freshwater wetlands, including ponds, swamps and marshes with pockets of emergent vegetation. They also use flooded hay meadows and agricultural fields as feeding locations. In Montana, white-faced ibises usually use old stems in cattails, hardstem bulrush, or alkali bulrush over shallow water as their nesting habitat (DuBois 1989). Water conditions usually determine whether nesting occurs in a particular area. Therefore, white-faced ibis nesting sites can often move around from year to year. However, it is a fairly adaptable species and the primary breeding requirement is colony and roosting site isolation (NHP 2004).

Franklin's Gull

In 1994, approximately 13,000 Franklin's gull nests were estimated to have occurred on Benton Lake NWR. The Franklin's gull generally returns to the state in mid-April and is gone by early to mid-October. Preferring large, relatively permanent prairie marsh complexes, the Franklin's gull builds its nests over water on a supporting structure of emergent vegetation. Nesting over water differs from the nesting habits of Montana's other, generally ground nesting, gulls. Franklin's gulls prefer to nest at sites with intermediate vegetation density, interspersed with open water of various sizes. One key feature of selected nesting sites is that the water levels remain high enough throughout the nesting period, or at least until the young can fledge, in order to provide protection from predators. During migration, the Franklin's gull can be found feeding on dry land, especially in cultivated fields prior to planting (NHP 2004).

Long-Billed Curlew

The long-billed curlew is ranked as S2B by the state and thus is considered at risk because of very limited and/or declining numbers, range, and/or habitat. The NHP did not have any element occurrence records for this species within the Project area; however, long-billed curlews were observed within the Project area. The long-billed curlew is a migratory summer resident that breeds and nests in Montana. The species inhabits shortgrass prairie communities, with grassland structure being more important than species composition, and appears to require large blocks of grasslands with diverse foraging habitats. The long-billed curlew nests in well-drained native grasslands, sagebrush, and agricultural lands with a gently rolling topography. The species migrates from coastal habitats in California, Texas, and Mexico, to Montana where it is typically present between May and August.

Bald Eagle

The cottonwood stands along the Marias and Teton rivers may be used by bald eagles during the winter; however, they are not known to nest in the Project area (Olson 2005b). The majority of birds nesting in Montana are found in the western third of the state, although breeding pairs may be found along many of the major rivers and lakes in the central portion of the state and along the Yellowstone and Missouri Rivers to the eastern prairie lands (NHP 2004). East of the Continental Divide, the presence of bald eagles may be somewhat more seasonally dependent than in the western part of the state. Migrants from northern climates travel through Montana to reach wintering grounds further south.

3.10.2.3 Fish

Four fish species identified within the Project area are listed by the NHP as threatened, endangered, or of special concern under the Montana Endangered Species Act (**Table 3.9-1**). The NHP species of concern occurrence report did not include any fish species of concern. However, a search of the Montana Fisheries Information System indicated that three special status fish species potentially occur in the Teton River within the Project area. These three species are: sauger, blue sucker, and sturgeon chub.

The sauger is considered at risk by the State because of very limited and/or declining numbers, range, and/or habitat. The current distribution of the sauger in Montana includes the main stem of the Missouri River and portions of several tributaries, including the Teton River near where the transmission line would span. The sauger is physiologically adapted for turbid environments, and the species typically inhabits large turbid rivers and shallow lakes. Saugers spawn in large tributaries, and juveniles rear in off-channel habitats during spring and summer before shifting to main channel habitats in autumn.

The blue sucker is considered at risk/potentially at risk by the State. Eastern Montana is the home of the blue sucker, and it appears to inhabit the larger streams, primarily the Missouri and Yellowstone rivers. However, blue suckers make long spawning movements from the lower Missouri River to upstream areas and tributary streams followed by dispersal downstream. Blue suckers prefer waters with low turbidity and swift current (NHP 2004). The Montana Fisheries Information System indicates that the blue sucker can be found in the Teton River within the Project area; however, this would be the western extent of this species' distribution within Montana.

The State considers the sturgeon chub at risk. The sturgeon chub is one of several native minnows found east of the continental divide. Sturgeon chubs are rarely seen or collected, so little is known about them. Their food habits are unknown, but the ventral mouth and short intestine indicate they feed on bottom-dwelling insects. Sturgeon chubs are found in turbid water with moderate to strong current over bottoms ranging from rocks and gravel to coarse sand (NHP 2004).

3.10.3 Environmental Impacts

3.10.3.1 Alternative 1 – No Action

Under the No Action alternative, the proposed Project would not be implemented. There would be no construction activities or associated activities related to a new transmission line and existing electrical transmission service would be maintained and operated at its current level. This would result in no impacts to special status plant species, special status wildlife species, or special status fish or their populations within the Project area.

3.10.3.2 Alternatives 2, 3, and 4 – Action Alternatives

Vegetation

Potential impacts to special status plant species for each alternative transmission line alignment were assessed through an evaluation of existing conditions and potential Project-related effects. These effects could include temporary disturbance, such as trampling, during construction and maintenance activities, habitat loss and fragmentation associated with structure footprints and access roads, the creation of new public access into undisturbed habitats, and possible noxious weed competition resulting from seed introduction from construction and maintenance activities. See Section 3.7.3 for further discussion of the proposed transmission line effects on native plants. Three state sensitive wetland species occur in or adjacent to the Project area; however, no federally listed species were located in the area. The state sensitive species are: many-headed sedge, long sheath waterweed, and chaffweed (**Table 3.10-1**). Historic occurrences of the state sensitive non-vascular species entosthodon mossand American funaria moss were recorded south of the Missouri River, outside of the study area.

The effects on special status vegetation species associated with construction, operation, and maintenance of the proposed transmission line would not differ from those discussed in Section 3.7.3. Furthermore, all special status vegetation species known occurrences are located outside of the analysis area and are therefore not likely to be affected by the alternative transmission line alignments.

Of the action alternatives, Alternative 3 has the least likelihood of affecting species of concern because it crosses less riparian habitat than Alternatives 2 and 4 (**Table 3.7-4**).

Wildlife

Potential impacts to special status wildlife species for each alternative transmission line alignment were assessed through an evaluation of existing conditions and potential project-related effects. These effects could include temporary disturbance during construction and maintenance activities, habitat loss, and fragmentation effects associated with clearing and grading of structure sites and access roads, and the creation of new public access into undisturbed habitats. For a more detailed discussion of general impacts of the proposed transmission line on wildlife, see Section 3.8.3. Sensitive or important wildlife habitats for species of concern within the project area include: intact native prairie grasslands that provide habitat for sharp-tailed grouse, long-billed curlew, and other grassland bird species and mature riparian cottonwood stands that represent a unique habitat type and potential bald eagle winter habitat. Only Alternative 3 would cross cottonwood stands over the Marias and Teton River.

The alternative alignments traverse the known habitat range of five species of concern and one federally threatened species. **Table 3.10-3** lists the linear miles of special status species' habitat range along each of the three action alternatives.

TABLE 3.10-3
LINEAR MILES OF SPECIAL STATUS SPECIES' HABITAT RANGE BY ALTERNATIVE

Common Name	State Rank	Alternative		
		2	3	4
Black-crowned night-heron	S3B	11.2	9.1	2.6
Black-necked stilt	S3, S4B	11.2	9.1	2.6
Burrowing owl	S2B	4.2	3.9	0
Ferruginous hawk	S2B	6.5	0	7.0
Peregrine falcon	S2B	2.5	2.2	3.0
Total for All species (Minus the overlap)	--	19.9	11.3	11.7

Notes:
Source: NHP. 2005. GIS Analyses of Element Occurrence Data. Montana Natural Heritage Program, Helena, Montana. Available at: **http://nhp.nris.state.mt.us/mbd**,.

State: S2 = Imperiled because of rarity, or because of other factors demonstrably making it very vulnerable to extinction throughout its range; B = a state rank modifier indicating breeding status for a migratory species; S3 = vulnerable because of rarity, or found in restricted range even though it may be abundant at some of its locations; S4 = apparently secure, though it may be quite rare in parts of its range, especially at the periphery.
-- = not applicable

Bald Eagles (Federally Threatened)
Bald eagles would not be affected by the construction activities related to the transmission line, as there is no known breeding habitat within the transmission line alignments. In addition, wintering bald eagles that may use the cottonwood stands along the Marias and Teton rivers would not be disturbed because construction activities would occur during the spring and summer months.

The operation of the proposed transmission line could potentially impact bald eagles that may utilize the project area. As with all birds and raptors, there is the potential for transmission line related collisions and electrocutions. Raptor species, such as eagles, are less likely to collide with power lines, perhaps due to their excellent eyesight and tendency to not fly at dusk or in low visibility weather conditions (Olendorff et al. 1981). Impacts would be avoided as action alternatives would implement environmental protection measures that would reduce the potential for avian collisions. Areas with a higher likelihood for avian collisions, such as known flyways, were avoided. In addition, MATL would apply *Suggested Practices for Raptor Protection on Power Lines*, developed by the EEI and APLIC (1996), as appropriate, during design and construction of overhead structures and substation additions. Avian collisions would be reduced as approved line marking devices would be installed every 50 feet on overhead ground wires within all stream, river, and wetland crossings, such as crossings of the Marias River, the Dry Fork Marias River, Teton River, and the area east of Benton Lake NWR and within a ¼-mile buffer around these features. These marking devices would also be placed on any additional important flyway or migration routes that may be identified during pre-construction or construction activities. Monitoring of potential problem areas after construction would ensure that line markers are functioning properly. For more discussion of avian collisions and transmission lines, see Wildlife Section 3.8.

Electrocution of eagles was an issue of concern prior to the development of "avian-safe" structures. MATL transmission line design standards provide adequate spacing to eliminate the risk of raptor electrocution. MATL's line would incorporate avian-safe structures that provide adequate clearance to accommodate a large bird between energized and/or grounded parts. These structures typically have 60 inches of horizontal separation, which can accommodate the wrist-to-wrist span of an eagle. In addition, vertical separation of at least 48 inches can accommodate the height of an eagle from head to feet (APLIC and FWS 2005).

Burrowing Owl (State Sensitive)
The transmission line alignments would pass through burrowing owl habitat along the east side of Benton Lake NWR. While biologists did not observe any burrowing owls during field investigations, FWP biologists (Olson 2005b) and landowners have reported seeing this species within 1 mile of the action alternative alignments, north of the Marias River. The installation of support structures may disturb undetected

burrows and displace burrowing owls. However, the amount of habitat loss would be relatively minor and displaced owls would have adjacent burrow habitat to occupy in the event of disruption of burrows. Operation of the proposed transmission line could increase owl collisions. This would be expected to be rare as owls have excellent vision and MATL would be using line-marking devices within designated areas. For more discussion of avian collisions and electrocutions from transmission lines, see Wildlife Section 3.8.

Black-necked Stilt and Black-crowned Night-heron (State Sensitive)

The transmission line alignments pass through the eastern edge of potential nesting grounds for the black-necked stilt and black-crowned night heron just outside the eastern boundary of Benton Lake NWR. This area is a potential migration corridor on the east side of Benton Lake NWR. Nesting stilts and herons may be disturbed and displaced during nesting season as a result of construction activities. This may interfere with the nest success of birds within or adjacent to the construction areas; however, construction activities would be temporary and the opportunity for re-nesting would likely occur. Permanent habitat loss would be limited to the footprint of the support structures and access roads. This habitat loss would be a relatively minor amount with respect to the available habitat within the area.

Ferruginous Hawk (State Sensitive)

Ferruginous hawk habitat is known to occur within and adjacent to the Project area. Impacts to ferruginous hawks would not vary from impacts to other raptors. A discussion of impacts to raptor is in Wildlife Section 3.8.

Long-billed Curlew (State Sensitive)

Long-billed curlews were observed in wheat-stubble fields and CRP land during field investigations throughout the summer 2005 (MATL 2006b). Long-billed curlews would experience temporary disturbance and displacement during installation; however, construction activities would be temporary and the opportunity for re-nesting would likely occur. In addition, there would be habitat loss as a result of support structures and access roads; however, this would be relatively minor and would not impact populations within the area. See Wildlife Section 3.8 for further discussion of the proposed transmission line impacts on birds.

Peregrine Falcon (State Sensitive)

The transmission line alignments cross the location of a historic peregrine falcon eyrie along the Marias River. In May, July, and August 2005 biologists surveyed the confluence of Cut Bank Creek and Two Medicine River looking for the eyrie and signs of peregrine falcons; neither eyrie nor peregrine falcons were observed (MATL 2006b). It is unknown when peregrine falcons last occupied or were sighted around this eyrie (Olson 2005b). The construction activities associated with the proposed transmission line could potentially disturb the peregrine falcon eyrie, if occupied. Disturbances would be temporary and would not directly disturb any occupied nest sites. For a discussion of collision and electrocution impacts on raptors, see Wildlife Section 3.8.

Fish

A search of the Montana Fisheries Information System indicated that three special status (State Sensitive) fish species potentially occur in the Teton River within the Project area. These three species are: sauger, blue sucker, and sturgeon chub. No federally threatened, endangered, or candidate fish species were identified in the Project area.

Effects on special status fish associated with the implementation of the proposed transmission line would not differ from those discussed in Section 3.9.3.

3.11 Air Quality

3.11.1 Analysis Methods

Potential impacts to air quality from installation of the power transmission line were evaluated using criteria pollutant emission rates from sources (for example, equipment engines and dust from construction activities) and air regulations (including emission standards, as applicable) pertinent to the project.

Analysis Area

The analysis area for air resources is the MFSA application Project study area (**Figure 1.1-1**) and the surrounding air shed within a distance of 10 miles. The analysis area is located in north central Montana and exhibits terrain described as rolling hills with elevations ranging from 3,400 feet (Great Falls) to 3,800 feet (Cut Bank) above mean sea level.

Information Sources

Base information for the analysis of air resources was derived from the Montana MFSA application (MATL 2006b). Base information includes data such as the alignments, area impacted by construction activities, equipment type, and duration of construction. Comparative information, such as ambient air quality, atmospheric conditions, and existing air emission sources, were derived from databases maintained by National Oceanic and Atmospheric Administration (NOAA) (2006), EPA (2006a, 2006b), WRCC (2006), and DEQ (2006a). Regulatory standards for air quality (for example, criteria pollutants) were obtained from EPA (2006b) and DEQ (2006a, 2006b).

3.11.2 Affected Environment

Air quality in the analysis area is affected by activities currently conducted within the area. Examples of such activities include fixed facilities such as petroleum refining plants (refineries), crude oil and natural gas compressor stations, petroleum product terminals, coal-fired electrical generating plants, concrete mix plants, asphalt mix plants, and crematoriums. Portable source examples include facilities such as gravel crushers, associated processing equipment, asphalt plants, and farming. Smoke from grass and forest fires from late spring through early fall can degrade air quality depending on the year.

Climate

Climate is influenced by major topographic features, including the plains of northern Montana, and, 40 to 60 miles to the west, by the Rocky Mountains. The continental divide and Rocky Mountains traverse the western half of Montana in roughly a north-south direction. The continental divide exerts a marked influence on local climate. Climate characteristics east of the continental divide are decidedly continental. In general, the analysis area (east of the continental divide) is colder, is characterized by lower precipitation, and is windier than conditions west of the divide.

Plains in the analysis area range in elevation from about 3,400 to 3,800 feet above mean sea level. Summers typically receive 1 to 2 inches of precipitation per month with temperatures ranging from warm to hot. Winters, while usually cold, have few extended cold spells. Between cold waves there are periods of mild but often windier weather called “chinook” weather. Wind speed and direction data for the subject area from NOAA show varying speeds and direction. Based on data observed at Great Falls, the typical wind speed averages 10.5 miles per hour and blows primarily from the southwest. Chinook winds frequently reach speeds of 25 to 50 miles per hour or more and can persist, with little interruption, for several days.

Temperature and Precipitation

Based on long-term precipitation data collected in Great Falls, Montana, the average daily temperature of the study area ranges from 30°F in January to 83°F in July. Average monthly precipitation ranges from 0.6 inch in February to 2.5 inches in May. The largest amount of precipitation occurs during the spring in May and June. Summer precipitation is often associated with thunderstorms. Total annual precipitation from 1961 to 1990 averaged 15.2 inches per year.

Fall and winter are cool to cold with few extended cold spells. Most precipitation during this period is in the form of snow; annual snowfall ranges from 14 to 60 inches with heavier accumulations generally recorded closer to Great Falls.

Air Quality

DEQ and the federal government have established ambient air quality standards for criteria air pollutants including carbon monoxide (CO), lead (Pb), sulfur dioxide (SO_2), particulate matter smaller than 10 microns (PM_{10}), ozone, and nitrogen oxides (NO_x). In 1997, the EPA revised the federal primary and secondary particulate matter standards by establishing annual and 24-hour standards for particles 2.5 micrometers in diameter or smaller ($PM_{2.5}$).

Table 3-11.1 lists federal and state air quality standards. National primary standards are levels of air quality necessary, with an adequate margin of safety, to protect public health. National secondary standards are levels of air quality necessary to protect public welfare from known or anticipated adverse effects of a regulated air pollutant.

The attainment status for pollutants within the project area is determined by monitoring levels of criteria pollutants (CO, Pb, SO_2, PM_{10}, ozone, and NO_x) for which National and Montana Ambient Air Quality Standards exist. Air quality in the analysis area is designated as attainment for all criteria pollutants. The attainment designation means that no violations of Montana or national air quality standards have been documented in the area. Great Falls was reclassified in 2002 by the EPA from non-attainment for carbon monoxide to attainment.

TABLE 3.11-1
STATE OF MONTANA AND NATIONAL AMBIENT AIR QUALITY STANDARDS

Pollutant	Averaging Time	Air Quality Standard Concentration [a]	
		Montana	National
Ozone	1 hour	195 µg/m³ (0.12 ppm)	235 µg/m³ (0.12 ppm)
	8 hours	--	157 µg/m³ (0.08 ppm)
Carbon Monoxide	1 hour	25,560 µg/m³ (23 ppm)[b]	40,000 µg/m³ (35 ppm)
	8 hour	10,000 µg/m³ (9.0 ppm)[b]	10,000 µg/m³ (9.0 ppm)
Nitrogen Oxides	Annual Arithmetic Mean	100 µg/m³ (0.05 ppm)	100 µg/m³ (0.05 ppm)
Sulfur Dioxide	Annual Arithmetic Mean	52 µg/m³ (0.02 ppm)	80 µg/m³ (0.03 ppm)
	24 hours	261 µg/m³ (0.10 ppm)	365 µg/m³ (0.14 ppm)
	3 hours	--	1,300 µg/m³ (0.50 ppm)
	1 hour	1,300 µg/m³ (0.50 ppm)	--
Particulate Matter as PM_{10}	Annual Arithmetic Mean	50 µg/m³	50 µg/m³
	24 hours	150 µg/m³	150 µg/m³
Particulate Matter as $PM_{2.5}$	Annual Arithmetic Mean	15 µg/m³	15 µg/m³
	24 hours	65 µg/m³	65 µg/m³
Lead (Pb)	Quarterly Arithmetic Mean	1.5 µg/m³	1.5 µg/m³

Note: µg/m³ = micrograms per cubic meter; ppm = parts per million; PM_{10} = Particulate Matter smaller than 10 microns; $PM_{2.5}$ = Particulate Matter smaller than 2.5 microns.
Sources: Administrative Rules of Montana (ARM) 17.8 and 40 CFR Part 50, National Primary and Secondary Ambient Air Quality Standards
a Primary Standard unless otherwise noted
b Secondary Standard

Air Quality Monitoring Data

Ambient air quality data have been collected in or near the analysis area at monitoring stations in Great Falls and Browning, Montana. Data from monitoring stations in Browning (approximately 35 miles west of the power line alignment) were included to provide a second source (that is, city location) of information. Data collected at the Great Falls sites include criteria pollutants PM_{10}, $PM_{2.5}$, SO_2, and CO. Data collected at the Browning sites include the criteria pollutant PM_{10}. Air quality data for criteria pollutants are presented in **Appendix K.**

PSD Classification

The analysis area and vicinity are designated Class II, as defined by the federal Prevention of Significant Deterioration (PSD) provision of the Clean Air Act. The PSD Class II designation allows for moderate growth or degradation of air quality within certain limits above baseline air quality. Industrial emission sources proposing construction or modifications must demonstrate that the proposed emissions would not cause major deterioration of air quality in all areas. The standards for significant deterioration are more stringent for Class I areas than for Class II.

Federal/State Mandatory Class I areas located within 100 miles of the project area include Scapegoat Wilderness (50 miles west), Bob Marshall Wilderness (50 miles west), Glacier National Park (40 miles west), and Gates of the Mountains Wilderness (50 miles southwest).

Existing Sources

There are multiple air emission sources in the vicinity of the project area. Some of the permitted fixed facilities include petroleum refining plants (refineries), crude oil and natural gas compressor stations, petroleum product terminals, concrete mix plants, asphalt mix plants, crematoriums, and other facilities. Permitted portable facilities include gravel crushers and associated processing equipment, and asphalt plants. These facilities operate under specific permit limits for criteria pollutants such as PM_{10}, $PM_{2.5}$, SO_2, CO, and Pb. Other potential emission sources (for example, fugitive dust and smoke sources) include farming, field and forest burning, and dust from gravel roads.

Particulate Emissions

Potential sources of particulate (for example, PM_{10}, $PM_{2.5}$) emissions for the action alternatives could come from equipment used during the construction of the power line and from equipment used to conduct maintenance and make repairs to the transmission line during the life of the project. Possible emissions during construction include fugitive dust from vehicles and equipment traveling on dirt roads and from engine exhaust.

Gaseous Emissions
Potential sources of gaseous (for example, NO_2, SO_2, and CO) emissions for the proposed Project could come from equipment used during the construction of the power line and from equipment used to conduct maintenance and make repairs to the transmission line during the life of the project. Possible emissions could be associated with engine exhaust from equipment traveling to the site and along access roads.

Air Quality Permitting
Industrial air quality permitting is part of the Montana State Implementation Plan process. DEQ uses air quality permit conditions to help ensure compliance with applicable Montana and National Ambient Air Quality Standards and PSD increments. Work conducted under the proposed Project would be subject to Administrative Rules of Montana (ARM) Title 17, Chapter 8 (Air Quality). Due to the nature of the project (that is, mobile equipment and short duration of construction), no specific permit requirements apply to gaseous emissions. However, construction would be required to comply with fugitive dust provisions under subchapter 3, which require precautions to control airborne particulate emissions.

3.11.3 Environmental Impacts

Under all alternatives, no air quality permit or prevention of significant deterioration analysis would be needed.

3.11.3.1 Alternative 1 - No Action

Emissions

Under the No Action alternative, the power line would not be constructed and emissions and air quality in the area would remain at current levels.

3.11.3.2 Alternatives 2, 3, and 4 – Action Alternatives

Alternatives 2, 3, and 4 would result in an increase in activities that could adversely affect air quality during construction (short term), and during operation and maintenance of the transmission line (long term). For example, construction equipment (earthmoving equipment, cranes, or other equipment) and support vehicles (crew transportation, fueling, or other vehicles) would be used during the construction phase, and lighter equipment (for example, four-wheel-drive pickups) would be used during the operation and maintenance period. The construction phase is anticipated to last approximately 8 months. Operations and maintenance activities would last the life of the project, but impacts would be intermittent (for example, monthly and quarterly) and relatively minor compared to impacts during construction.

Emissions
Emissions from construction equipment and support vehicles would be transient and short term. The duration of the adverse impact would be a function of whether the source activity is associated with construction, or with operations and maintenance activities. The majority of the adverse impact would occur during the project construction phase when there is a relatively larger amount of equipment movement and vehicular traffic. Air quality impacts would include fugitive dust and gaseous emissions from engine operation. Fugitive dust would be controlled through dust control measures such as water sprays, limiting the speed of construction equipment, and reseeding the disturbed areas at the end of the construction period. Gaseous emissions would be limited through construction management and scheduling.

Differences in the rate of emissions between alternatives would be a function of the amount of time project vehicles and equipment are used in the transmission line right of way. The amount of time equipment is used depends on several factors including, but not limited to, length of the transmission line for each alternative, overall topography and the presence of difficult or steep terrain, and the number of stream crossings. An alternative characterized by a longer alignment or difficult terrain would result in overall greater emissions.

3.12 Audible Noise

Noise is defined as unwanted sound; it may be intermittent, continuous, steady, impulsive, stationary, or transient. Noise levels are quantified using units of decibels. The A-weighted scale approximates the human ear's response to sounds most effectively. These measurements are reported in A-weighted decibels (dBA).

Audible noise from transmission lines is primarily due to point source corona (crackling and hissing with small amounts of light). It routinely occurs when air is ionized around a gap, burr, irregularity, or some non-insulated component during the conductance of electricity across power lines. Periods of rain, fog, or heavy humidity amplify these corona effects due to the bridging capabilities of electricity and water. Additionally, corona is produced when transmission lines break down over time and their fastener components loosen resulting in an air gap. All corona-based noise sources would be point source locations due to the inconsistencies found along the line.

In addition to audible noise due directly to the transmission line and to other environmental factors, noise can be generated as a result of wind blowing across power lines and power poles when airflow is non-laminar (see Section 3.12.3).

3.12.1 Analysis Methods

Analysis Area

The analysis area for noise is the proposed and alternative transmission line alignments. Noise estimates were made at the edge of the EMF safety zone and 100 feet to either side of the centerline.

Information Sources

The U.S. Department of Housing and Urban Development (HUD) noise level criteria that developments and industrial construction must adapt to are a 65 dBA day/night noise level (L_{dn}) for exterior environments and 45 dBA L_{dn} for interior home environments (HUD 2001).

The DOE BPA conducted research to determine the likelihood of receiving complaints related to transmission line audible noise. These noise values can be related to the level that would be exceeded 50 percent of the time during rain over 1 year (L_{50}) (BPA 1982). The L_{50} values, under foul weather, are calculated at 100 feet from the centerline (BPA 1982).

The following probabilities of receiving complaints are based upon their expected audible noise level:

- High, Numerous Complaints: 60 dBA
- Moderate, Some Complaints: 52 to 60 dBA
- Low, No Complaints: 52 dBA

MATL used the BPA Corona and Field Effects Program (Version 3.0) to determine the decibel levels from the centerline for the H-frame and monopole structures (MATL 2006b).

3.12.2 Affected Environment

With the exception of the immediate Cut Bank area, the proposed project alternatives are located in a rural, predominantly agricultural area. Sources of background noise to rural residents and occasional visitors to the area include wind, agricultural activity, recreation (primarily hunting), and vehicles traveling the numerous county and state roadways and Interstate 15 in proximity to these alternatives. See **Table 3.12-1** for common noise sources and their noise levels.

TABLE 3.12-1
NOISE LEVELS OF COMMON SOURCES

Sound Source	Sound Pressure Level (dBA)
Air raid siren at 50 feet	120
Maximum levels in audience at rock concerts	110
On platform by passing subway train	100
On sidewalk by passing heavy truck or bus	90
On sidewalk by typical highway	80
On sidewalk by passing automobiles with mufflers	70
Typical urban area background/busy office	60
Typical suburban area background	50
Quiet suburban area at night	40
Typical rural area at night	30
Isolated broadcast studio	20
Audiometric (hearing testing) booth	10
Threshold of hearing without hearing damage	0

Source: Cowan 1994
dBA = A-weighted decibels.

General noise level data from the EPA and the National Transit Institute were used to provide a typical sound level range for rural residential and agricultural cropland uses. Typical baseline noise levels in the Project study area likely range from approximately 30 dBA to 48 dBA (EPA 1978).

ARM 17.20.1607(2)(a) states "for electric transmission facilities, the average annual noise levels, as expressed by dBA-L_{dn} would not exceed 50 decibels at the edge of the right of way in residential and subdivided areas." The BPA design criterion for corona-generated audible noise (L_{50}, foul weather) is 50 +/-2 dBA at the edge of the right of way (BPA 1982).

Commercial and industrial activities (linear/point facilities) within the analysis area include communication sites (cell towers, microwave facilities), oil and gas development, surface mines (gravel pits), airstrips (public and private), railroads, pipelines and transmission lines, roadways, and military installations (MATL 2006b) Additionally, most residential areas (sensitive receptors) throughout the analysis area are approximately ¼ mile from the proposed transmission line centerline and alternative alignments.

3.12.3 Environmental Impacts

3.12.3.1 Alternative 1 – No Action

There would be no noise impacts related to selection of the No Action alternative.

3.12.3.2 Alternatives 2, 3 and 4 – Action Alternatives

Noise resulting from these alternatives would come from construction, corona effects, and wind.

Short-Term Adverse Impacts

Transmission line construction would require the short-term use of the following kinds of construction equipment: cranes, augers, compressors, air tampers, generators, haul trucks, bulldozers, excavators, concrete equipment, and other equipment. Construction activities would create both intermittent and continuous noises throughout the project at multiple pole locations along the chosen alignment. Intermittent noises would be created by passing trucks, loading and unloading operations, drilling, and other activities. Continuous noises would be created by generators, air tampers, compressors, and drilling operations.

The typical range of noise for earthmoving equipment at 50 feet is from 72 to 96 dBA. Typical ranges of noise for material handling equipment is from 75 to 88 dBA. Noise values 100 feet from the source are 66 to 90 dBA; noise values ¼ mile away are 44 to 68 dBA. Different makes and models of equipment, motor idling speeds, engine maintenance characteristics, and overall muffler performance would result in different dBA values.

The transmission line support structures would average approximately 500 to 800 feet apart and would be constructed within the alignment (MATL 2006b). Approximately 10 to 12 transmission line structures would be erected per day. Therefore, the areas directly perpendicular to the facility location would be affected approximately half the day during the construction process (VandenBos 2006).

During the construction process, vibration levels from heavy equipment grading, transport, and compacting activities may cause vibrations noticeable to residents within 100 feet. The peak vibration level from pile driving activities would cause the largest perceptible impact within the facility location. Other activities such as large trucks and equipment motoring over potholes and rocks would cause slight noticeable vibrations up to 100 feet.

<u>Long-Term Adverse Impacts</u>

Corona

Table 3.12-2 identifies the audible noise values calculated in MATL's permit application when simulating the 230-kV transmission line for both H-frame structures and monopole structures. Standard transmission line building constituents were used including a rain rate (applicable to audible noise) of 0.14 inch per hour (MATL 2006b). BPA indicated that the rain data typically used in the program are from an average of rainfall throughout the northwest region (Sterns 2006) which has more precipitation per year than the analysis area. Additionally, the rain events are a shorter duration than those of the analysis area, which would limit the audible noise dose received at the boundary from the centerline (100 feet). Based upon historic weather data from the WRCC, the city with the highest rainfall is Great Falls with an average of 14.81 inches per year (WRCC 2006). Actual local conditions for rain are around 0.0017 inch per hour. The BPA modeling formula for transmission noise indicates that more noise is expected with larger amounts of rain. Therefore, the estimated noise calculated by MATL (**Table 3.12-2**) is considerably higher than what would actually be generated.

Table 3.12-2 indicates that for H-frame structures, audible noise levels of 46.23 dBA and 49.56 dBA would be expected at distances of 100 feet, and 52.33 feet (edge of safety zone) from the centerline, respectively. These values would be below the recommended guidelines for corona-generated 50 +/- 2 dBA at the edge of the right of way, developed by BPA, and the 65 dBA exterior noise housing regulations developed by HUD.

TABLE 3.12-2
AUDIBLE NOISE EFFECT

Pole Type	Distance from Centerline (feet)	Audible Noise (dBA) (L_{50})
H-frame Double Pole	100	46.23
	52.33	49.56
Monopole	100	47.13
	54	50.00
	30.18	52.48

Notes:

Estimates calculated using Corona and Field Effects Program (Kingery 1991), and based on conductor ground clearance of 19.72 feet (NESC specification). dBA (L_{50}) = decibels (A-weighted) during foul weather, indicated by L_{50}.

No data are available for noise generated by wind.

Wind

Noise can be generated as a result of wind blowing across power lines and power poles when airflow is non-laminar. Only limited research has been conducted to address wind-caused noise due to transmission line placement in urban and rural settings. For example, a wind velocity of 20 meters per second across a single conventional-style conductor cable resulted in a single-point octave band center frequency of 55 dBA at 100 hertz (Furukawa Review 2002). Data from multiple conductor lines for varying wind velocities are not available.

3.13 Socioeconomics

3.13.1 Analysis Method

Analysis Area

The socioeconomic analysis area defined for the Project includes portions of Cascade, Chouteau, Glacier, Pondera, Teton, and Toole counties. This section provides the demographic, social, and economic profiles of each of these counties. These profiles will serve as a basis from which to estimate potential impacts to the socioeconomic condition of the region should the Project be implemented. This section also includes the baseline conditions for evaluating effects of the Project on minority and low income populations in accordance with the February 11, 1994, Executive Order 12898: *Federal Actions to Address Environmental Justice in Minority and Low Income Populations* (February 11, 1994).

Information Sources

The demographic profiles for each county are based on U.S. Census data collected in 2000, as presented in the MFSA application (MATL 2006b). Population and growth estimates developed in 2005 by the U.S. Census Bureau are also referenced, although these data are not uniformly available across all counties and towns within the analysis area. As a result, these estimates are generally not used for quantitative analysis, but may be used in certain instances to provide a temporal characterization of a specific locality when appropriate. Additional demographic and economic statistics were compiled from various sources including, but not limited to, the Montana Department of Labor and Industry, Montana Department of Commerce, and the USDA.

Estimates of construction labor force and capital construction costs are based on available information from MATL and figures developed during construction of similar projects occurring elsewhere.

Information related to public services, including level of service and capacity, was obtained through documents provided by MATL to DEQ in the spring of 2006.

Methods of Analysis

Direct, indirect, and cumulative impacts to socioeconomic resources were assessed based on reviews of similar projects that have occurred in the state and other relevant energy industry policy documents and through interviews with individuals whose fields of expertise and experience provide insight relevant to this specific project. Such sources are referenced as appropriate. Conclusions regarding the impacts to local services that may occur during construction, operation, and maintenance of the project were developed by evaluating the number of employees and the duration of these activities relative to the availability of services and amenities that may be required.

3.13.2 Affected Environment

The discussion below presents information on demographics, economic activity, and local resources for each county in the analysis area.

3.13.2.1 Demographics

The Project analysis area is characterized by large expanses of open, sparsely populated agricultural land. Over 88 percent of the land within the analysis area is cropland, while the remaining agricultural lands are used for grazing or are under the federal CRP (MATL 2006b). Like much of the upper Great Plains, market forces triggered in part by advances in farming technology, consolidation of large ranch tracts into corporate production, and large tracts removed from production under the CRP have contributed to a decline in the populations of Pondera and Toole counties and general stagnation of growth in Teton County since the 1960s. The Montana Department of Labor and Industry (2005) reports that oil and gas account for only about 11 percent of Toole County's total wages and even less in the other counties in the analysis area. These factors combine to reduce demand for labor and demand for goods and services related to agricultural and energy production. The population of Chouteau County has similarly declined to less than half the number of people today than were there in the early 1900s. However, the 2005 estimated population of Chouteau County is about the same as the reported population in 1990 (U.S. Census Bureau 2005a). Meanwhile, growing tribal population on the Blackfeet Reservation, which makes up the largest population sector in Glacier County, has resulted in a growth rate in that county that has mirrored the state's growth pattern. The state's population grew by almost 13 percent between 1990 and 2000, while the population of Glacier County grew by 9.3 percent during that same time period. Growth levels for both the state and Glacier County have tapered since then, to 3.7 percent and 2.3 percent, respectively. Cascade County's population grew steadily, about 0.6 percent annually, throughout most of the 1900s, but tapered off toward the end of the century and is estimated to have decreased since the 2000 federal census years (U.S. Census Bureau 2000a).

Demographic data for each of the counties within the Project analysis area, as generally described in MATL's MFSA Application (MATL 2006b), are presented below and summarized in **Tables 3.13-1** and **3.13-2**.

TABLE 3.13-1 DEMOGRAPHIC PROFILES OF COUNTIES WITHIN THE PROJECT ANALYSIS AREA													
	Cascade County		**Teton County**		**Chouteau County**		**Pondera County**		**Toole County**		**Glacier County**		**Percent in Montana**
	No.	Percent in County	No.	Percent in County	No.	Percent in County	No.	Percent in County	No.	Percent in County	No.	Percent in County	
Total Population	80,357 79,298 (2001)	--	6,445	--	5,970 5,575 (2004)	--	6,424	--	5,267	--	13,247 13,508 (2004)		
Gender													
Male	39,756	49.5	3,174	49.2	2,997	50.2	3,169	49.3	2,716	51.6	6,553	49.5	49.8
Female	40,601	50.5	3,271	50.8	2,973	49.8	3,255	50.7	2,551	48.4	6,694	50.5	50.2
Age													
15 or Younger	17,163	21.4	1,392	21.6	1,384	23.2	1,503	23.4	1,066	20.2	3,757	28.4	20.6
16 – 24	11,100	13.8	758	11.8	724	12.1	810	12.6	638	12.1	2,067	15.6	14.4
25 – 44	22,558	28.1	1,587	24.6	1,437	24.1	1,594	24.8	1,484	28.2	3,560	26.9	27.2
45 – 64	18,288	22.8	1,635	25.4	1,382	23.1	1,473	22.9	1,242	23.6	2,642	19.9	24.4
65+	11,248	14.0	1,073	16.6	1,043	17.5	1,044	16.3	837	15.9	1,221	9.2	13.4
Average Age	37.2	--	39.3	--	38.7	--	38.0	--	38.8	--	32.5		37.4

Notes:
Source: U.S. Census Bureau, 2005a
-- = Not applicable

TABLE 3.13-2 RACE AND ETHNICITY WITHIN COUNTIES IN THE PROJECT ANALYSIS AREA													
Race or Ethnicity	Cascade County		Teton County		Chouteau County		Pondera County		Toole County		Glacier County		Percent in Montana
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	
White	72,897	90.7	6,207	96.3	5,015	84.0	5,374	83.7	4,945	93.9	4,693	35.4	90.6
Black or African American	900	1.1	12	0.2	5	0.1	6	0.1	8	0.2	11	0.1	0.3
American Indian and Alaskan Native	3,394	4.2	98	1.5	873	14.6	929	14.5	168	3.2	8,186	61.8	6.2
Asian	652	0.8	6	0.1	14	0.2	9	0.1	16	0.3	9	0.1	0.5
Native Hawaiian and other Pacific Islander	67	0.1	0	0	6	0.1	3	0.1	1	0.1	7	0.1	0.1
Some other race	547	0.7	27	0.4	14	0.2	8	0.1	17	0.3	24	0.2	0.6
Two or more races	1,900	2.4	95	1.5	43	0.7	95	1.5	112	2.1	317	2.4	1.7
Hispanic or Latino	1,949	2.4	73	1.1	40	0.7	54	0.8	61	1.2	159	1.2	2.0

Note:
Percentages may not equal 100 because of rounding and potential duplicate counting for “some other race” and “two or more races.”

Cascade County

Cascade County encompasses the southern portion of the Project analysis area and is Montana's third most populous with 79,298 residents (U.S. Census Bureau 2000a). Cascade County covers approximately 2,698 square miles of land, resulting in an average population density of approximately 30 individuals per square mile. County population levels declined by approximately 2.7 percent between 1970 and 2005 based on estimates provided by the Montana Department of Commerce (2005).

The City of Great Falls is the largest population center (56,622 people based on the 2000 federal census) in the county and is also the county seat. Other towns in Cascade County include Belt, Black Eagle, Cascade, Fort Shaw, Monarch, Neihart, Simms, Stockett, Sun River, Ulm, and Vaughn. These towns range in size from approximately 70 people to close to 1,000 in Black Eagle, according to U.S. Census Bureau Data (2000a). Malmstrom Air Force Base is also located in Cascade County east of Great Falls and accounts for approximately 5,400 people in the county (Great Falls Development Authority 2005).

Average family size within Cascade County is 2.97 individuals, and the average household size is 2.41 individuals. Most people are homeowners (64.9 percent), while the remainder rent housing. Less than 8 percent of housing units are unoccupied.

Chouteau County

Chouteau County encompasses 3,973 square miles. Based on the most recent population estimates of 5,463 individuals (Montana Department of Commerce 2005), the population density is approximately 1.4 persons per square mile. The 2005 population estimates, derived from tax records and birth and death statistics, suggest that Chouteau County has potentially lost up to 8.5 percent of its population between 2000 and 2005. This sharp decline balances with a similar increase in population between 1990 and 2000, but overall there has been a relatively steady decline since 1960. Communities within Chouteau County include the county seat of Fort Benton, Big Sandy, Box Elder, Carter, Geraldine, Iliad, Loma, and Shonkin. According to the 2000 federal census, the average family within Chouteau County contains 3.1 individuals and the average household size is 2.6 individuals. Approximately 69 percent of the county's residents are home owners while the remainder rent. The housing vacancy rate is fairly high at 19.8 percent.

Glacier County

After Cascade County, Glacier County is the most populous county within the Project analysis area with an estimated 2005 population of 13,552. Land area of the county is 2,995 square miles, resulting in an average density of 4.5 people per square mile. Unlike the other counties within the analysis area that have experienced a population reduction, Glacier County grew approximately 2.3 percent between 2000 and 2005 (Montana Department of Commerce 2005).

Principal communities in Glacier County include Babb, Browning, Cut Bank, Del Bonita, and Saint Mary. Cut Bank is the county seat and reported an estimated population of 3,155 in 2004 (U.S. Census Bureau 2005a). The Blackfeet Reservation accounts for the majority of the county's land area and the majority of the county's population. U.S. Census data indicate that in 2000, the total on-reservation and off-reservation trust land Blackfeet population was estimated to be about 10,100 and the on-reservation population alone was 8,507 (64.2 percent of the census year 2000 population). If all of these individuals reside in Glacier County, they would account for 76 percent of all people in the county. The Blackfeet tribe also represents a growing population in the county, which is likely the driving force behind Glacier County's growth (about 0.6 percent annually since 1970) (U.S. Census Bureau 2000b).

The average family in Glacier County consists of 3.6 individuals and the average household size is 3 individuals. About 62 percent of the residents are homeowners; the remainder rent. About 18 percent of the county's housing inventory is vacant.

Pondera County

Pondera County encompasses approximately 1,625 square miles and had an estimated population of 6,087 people in 2005 (Montana Department of Commerce 2005), resulting in an average population density of roughly 3.7 people per square mile. The 2005 population estimate indicates that the population of the county has declined by 5.2 percent since 2000. Historic population records indicate an annual decline of 0.2 percent since 1960.

Principal communities within Pondera County include Conrad, Heart Butte, and Valier. Conrad is the county seat.

The average family in Pondera County is comprised of 3.2 individuals and the average household size is approximately 2.6 individuals. Most of the county's residents own their principal residence (70.5 percent), while the remainder are renters.

Teton County

Teton County encompasses an area of 2,272.6 square miles. The total population as of 2000 was 6,445 persons, yielding a population density of approximately 2.8 persons per square mile. County population levels have been generally stagnant since about 1980, and recent population estimates for 2005 (Montana Department of Commerce 2005) indicate a 3.2 percent decline since 2000. Choteau is the county seat and is home to roughly 28 percent of the county's residents. The remainder of the population is distributed throughout unincorporated county lands and small towns and communities within the county, the largest of which is Fairfield with a 2004 estimated population of 641 (U.S. Census Bureau 2005a).

Average family size in Teton County is 3.1 individuals and the average household size is 2.5 individuals. Most people in the county own their home (75.4 percent) while the remainder rent. Approximately 12.8 percent of housing units are unoccupied.

Toole County

The total estimated population of Toole County in 2005 was 5,031 (Montana Department of Commerce 2005 and Montana Department of Labor and Industry 2005). Land area of the county is 1,911 square miles, yielding an average population density of 2.6 individuals per square mile. Communities in Toole County include the county seat of Shelby, which is also the most populous town in the county with approximately 3,304 residents in 2004 (U.S. Census Bureau 2005a) and Kevin, Sunburst, and Sweetgrass.

The average family contains 3.1 individuals, and the average household size is 2.5 individuals. Approximately 71.2 percent are homeowners. About 14.7 percent of the houses in the county are vacant.

3.13.2.2 Economic Activity

Economic activity in the analysis area ranges from heavy reliance on agriculture to growing development in the education, health, and social services sectors. In MATL's March 2006 response to DEQ comments, employment and labor trend data compiled from the U.S. Department of Labor, Bureau of Statistics were presented for each of the counties within the analysis area (MATL 2006b). These data were compiled for the last 5 years, documenting the total labor force available, total employment, total unemployment, and the resulting unemployment rate (**Table 3.13-3**). In general, unemployment rates have been fairly steady over the last 5 years, with three counties (Cascade, Teton, and Toole) seeing a small decline (0.5 percent or more) in total unemployment. Higher unemployment rates in Glacier County are attributable to the disproportionately higher unemployment rate on the Blackfeet Indian Reservation, which in 2005 was reported to be 69 percent of the available tribal workforce (Bureau of Indian Affairs 2005). The unemployment rate for the county as a whole, which is the highest of the analysis area counties, is reported at 8 percent, though this has fluctuated from a high of 8.2 percent to a low of 6.9 percent over the last 5 years. Pondera and Chouteau counties saw a slight increase (less than 1 percent) in unemployment over this time period (MATL 2006b).

TABLE 3.13-3
EMPLOYMENT AND DATA TRENDS BY COUNTY, 2000 – 2005[a]

Year	Labor Force	Employment	Unemployment	Unemployment Rate (%)
Cascade County				
2000	38,287	36,386	1,901	5.0
2001	38,419	36,719	1,700	4.4
2002	38,411	36,776	1,635	4.3
2003	38,558	36,992	1,636	4.2
2004	39,209	37,566	1,643	4.2
2005[b]	40,474	38,697	1,777	4.4
Chouteau County				
2000	2,799	2,698	101	3.6
2001	2,723	2,629	94	3.5
2002	2,474	2,387	87	3.5
2003	2,518	2,437	81	3.2
2004	2,633	2,454	88	3.3
2005[b]	2,694	2,590	104	3.9
Glacier County				
2000	5,715	5,248	467	8.2
2001	5,775	5,348	427	7.4
2002	5,585	5,199	386	6.9
2003	5,750	5,315	435	7.6
2004	5,942	5,466	476	8.0
2005[b]	6,105	5,614	491	8.0
Pondera County				
2000	2,976	2,836	140	4.7
2001	2,892	2,771	121	4.2
2002	2,745	2,630	124	4.5
2003	2,771	2,641	130	4.7
2004	2,715	2,568	147	5.4
2005[b]	2,764	2,612	152	5.5
Teton County				
2000	2,974	2,846	128	4.3
2001	2,926	2,815	111	3.8
2002	2,906	2,796	110	3.8
2003	2,949	2,840	109	3.7
2004	3,001	2,885	116	3.9
2005[b]	3,047	2,931	116	3.8
Toole County				
2000	2,523	2,422	101	4.0
2001	2,429	2,346	83	3.4
2002	2,348	2,266	82	3.5
2003	2,538	2,453	85	3.3
2004	2,586	2,500	86	3.3
2005[b]	2,661	2,568	93	3.5

Notes:
[a] Reflects 2000 Census-based geography, new model controls, 2000 Census inputs.
[b] Average through Nov. 2005
Source: U.S. Department of Labor, Bureau of Labor Statistics, 2005.

Countywide earnings data by industry sector were available for 2001 through 2004 (**Tables 3.13-4 through 3.13-9**). In general, the data for each county indicated an increase in total wages across most sectors. However, Cascade County experienced a marked decrease (almost 50 percent) in total wages within the natural resources and mining sector (agriculture, forestry, and mining) between 2001 and 2004. The decrease is likely attributable to growth in other, more urban-related sectors such as the information and health, education, and social services sectors. Teton County experienced a substantial decline in wages associated with the manufacturing industry sector (40 percent) over the same time period but saw large increases in retail trade (83 percent) and in the professional, scientific, management, administrative, and waste management industry sector (almost 400 percent). Elsewhere, wages in the natural resources and mining sectors generally held steady or increased. Large increases in wages in this sector were realized in Glacier County between 2002 and 2004 (approximately 91 percent), where oil and gas exploration, as a subsector of the mining industry, increased by 150 percent from 2001 to 2004 (Montana Department of Commerce 2006).

TABLE 3.13-4
INDUSTRY SECTOR EARNINGS TRENDS – CASCADE COUNTY

INDUSTRY	Total 2004 Wages by Sector (in thousands)	Trend between 2001-2004 (percent change)
Agriculture, forestry, fishing and hunting, and mining	2,815	-49.55
Construction	63,118	+21
Manufacturing	32,166	+0.3
Wholesale trade	51,191	+18
Retail trade	103,637	+6.7
Transportation and warehousing, and utilities	34,264	+4.1
Information	23,985	+23.7
Finance, insurance, real estate, and rental and leasing	89,744	+19.4
Professional, scientific, management, administrative, and waste management services	74,368	+17.5
Educational, health and social services	224,140	+16.7
Arts, entertainment, recreation, accommodation and food services	50,432	+16.8
Other services (except public administration)	23,672	+14.5
Public administration	67,345	+21

Notes:
Source - US Department of Labor, Bureau of Labor Statistics 2005.

TABLE 3.13-5 INDUSTRY SECTOR EARNINGS TRENDS – TETON COUNTY		
INDUSTRY	**Total 2004 Wages by Sector (in thousands)**	**Trend between 2001-2004 (percent change)**
Agriculture, forestry, fishing and hunting, and mining	1,263	+4.12
Construction	980	+68.38
Manufacturing	289	-40.17
Wholesale trade	4,459	+29.28
Retail trade	3,333	+83.23
Transportation and warehousing, and utilities	3,632	+21.55
Information	6,961	+15.38
Finance, insurance, real estate, and rental and leasing	2,698	+39.1
Professional, scientific, management, administrative, and waste management services	1,292	+396
Educational, health and social services	9,927	+22.4
Arts, entertainment, recreation, accommodation and food services	1,209	+3.6
Other services (except public administration)	483	-13.6
Public administration	3,242	+3

Notes:

Source - US Department of Labor, Bureau of Labor Statistics 2005.

TABLE 3.13-6 INDUSTRY SECTOR EARNINGS TRENDS – CHOUTEAU COUNTY		
INDUSTRY	**Total 2004 Wages by Sector (in thousands)**	**Trend between 2001-2004 (percent change)**
Agriculture, forestry, fishing and hunting, and mining	1,765	+23.0
Construction	433	+42.43
Manufacturing	444	-5.7
Wholesale trade	1,678	+71.4
Retail trade	2,837	+11.65
Transportation and warehousing, and utilities	793	+25.28
Information	N/A	N/A
Finance, insurance, real estate, and rental and leasing	864	-42.32
Professional, scientific, management, administrative, and waste management services	N/A	N/A
Educational, health and social services	9,192	+5.62
Arts, entertainment, recreation, accommodation and food services	1,182	+32.51
Other services (except public administration)	233	+29.44
Public administration	2,769	+12.84

Notes:

Source - US Department of Labor, Bureau of Labor Statistics 2005.

N/A – Not Disclosed: Data do not meet Bureau of Labor Statistics or State agency disclosure standards

TABLE 3.13-7 INDUSTRY SECTOR EARNINGS TRENDS – PONDERA COUNTY		
INDUSTRY	**Total 2004 Wages by Sector (in thousands)**	**Trend between 2001-2004 (percent change)**
Agriculture, forestry, fishing and hunting, and mining	748	-24.67
Construction	9,193	+14.88
Manufacturing	1,021	-23.7
Wholesale trade	3,117	+9.7
Retail trade	4,016	+15.43
Transportation and warehousing, and utilities	6,324	+9.03
Information	449	+39.44
Finance, insurance, real estate, and rental and leasing	1,908	+1.76
Professional, scientific, management, administrative, and waste management services	1,497	+6.4
Educational, health and social services	13,022	+4.48
Arts, entertainment, recreation, accommodation and food services	1,180	+21.65
Other services (except public administration)	523	-2.8
Public administration	847	+5.35

Notes:
Source - US Department of Labor, Bureau of Labor Statistics 2005

TABLE 3.13-8 INDUSTRY SECTOR EARNINGS TRENDS – TOOLE COUNTY		
INDUSTRY	**Total 2004 Wages by Sector (in thousands)**	**Trend between 2001-2004 (percent change)**
Agriculture, forestry, fishing and hunting, and mining	4,287	+19.82
Construction	833	+33.28
Manufacturing	424	-6.2
Wholesale trade	2,759[a]	N/A
Retail trade	3,652	+33
Transportation and warehousing, and utilities	473	+1.94
Information	1,449	+54.3
Finance, insurance, real estate, and rental and leasing	2,087	+29.55
Professional, scientific, management, administrative, and waste management services	5,343	+27.8
Educational, health and social services	10,370	+20.34
Arts, entertainment, recreation, accommodation and food services	3,304	+47.3
Other services (except public administration)	373	-3.1
Public administration	8,130	+228.4

Notes:
Source - US Department of Labor Bureau of Statistics 2005.
[a] 2002 Data, No Data Available for 2004
N/A– Not Available: comparison data do not meet Bureau of Labor Statistics or State agency disclosure standards

TABLE 3.13-9 INDUSTRY SECTOR EARNINGS TRENDS – GLACIER COUNTY		
INDUSTRY	**Total 2004 Wages by Sector (in thousands)**	**Trend between 2001-2004 (percent change)**
Agriculture, forestry, fishing and hunting, and mining	4,939	+90.62[a]
Construction	2,726	-5.05
Manufacturing	583	-15.87[a]
Wholesale trade	3,056	+29.66
Retail trade	8,102	+22.39
Transportation and warehousing, and utilities	3,081	-6.8
Information	309	+6.19
Finance, insurance, real estate, and rental and leasing	2,158	+13.04
Professional, scientific, management, administrative, and waste management services	2,195	+21.2
Educational, health and social services	27,113	+28.52
Arts, entertainment, recreation, accommodation and food services	12,640	+1.93
Other services (except public administration)	1,311	-13.8
Public administration	36,200	+11.47

Notes:
Source - US Department of Labor Bureau of Statistics 2005.
[a] – 2002 Data, No Comparison Data Available for 2001

Per capita personal income, or the amount of income that is received by a person from all sources, has generally increased for all of the counties within the analysis area (U.S. Department of Commerce 2006). For counties dependent on agriculture, increases or decreases in per capita income are typically attributable to the quantity and value of crops or livestock produced. For example, per capita income increased between 2001 and 2004 as a result of bumper crops of winter wheat and barley, particularly in Chouteau and Toole counties (**Table 3.13-10**).

TABLE 3.13-10 PER CAPITA PERSONAL INCOME TRENDS		
County	**Per Capita Personal Income – 2004**	**Percent Change in Per Capita Personal Income, 2003 - 2004**
Cascade	$29,231	+5.9
Chouteau	$27,303	+13.6
Glacier	$20,637	+7.6
Pondera	$23,709	+4
Teton	$26,158	+6.6
Toole	$28,100	+12.3

Notes:
Source - Regional Economic Information System, Bureau of Economic Analysis, U.S. Department of Commerce, April 25, 2006.

Additional details regarding the social and economic activities within each of the counties located in the analysis area are provided in MATL (2006b) and summarized for each county below.

Cascade County

The economy of Cascade County is heavily influenced by the commerce and trade activities centered in and surrounding Great Falls, Montana's second largest city. This area provides the goods and services and other amenities drawn upon throughout the region. The largest private economic sector in the county is health care and social assistance, which accounts for nearly 24 percent of non-government employment. Another 14.2 percent of the labor force works in the retail trades. Malmstrom Air Force Base, located just to the east of Great Falls, is home to several thousand military personnel and their families and employs about 4.9 percent of the county's population (approximately 3,000 people). According to the USDA, there were 1,037 farms in Cascade County in 2002, a slight drop (1.2 percent) since the 1997 agricultural census (USDA 2004).

Median household income in Cascade County in 2003 was $34,471, or 100.1 percent of the state's median household income (USDA Bureau of Labor Statistics 2005). Approximately 13.9 percent of the county's residents lived below the poverty level during 2003 (U.S. Census Bureau estimates 2005b).

Property tax revenues made up over 48 percent of all county revenues in fiscal year 2004-2005. Public safety was the largest segment draw on the county budget. For fiscal year 2004-2005, Cascade County appropriated $2,356,823 to its road fund, $39,451 to its rural fire fund, $165,088 to its emergency medical fund, and $6,811,144 to the public safety fund (MATL 2006b).

Chouteau County

The largest economic sector in Chouteau County is agriculture, accounting for almost 33 percent of the industries within the county and occupying over 90 percent of the county land area (USDA 2004). Still, the number of farms decreased by about 3.9 percent between 1997 and 2002 (USDA 2004). Education, health and social services combined constitute the next largest industry sector, followed by retail trades.

Chouteau County received the most dollars of any Montana county in federal farm subsidies in 2003—over $33 million (Montana Department of Labor and Industry 2006). These subsidies reflect payments made for CRP lands, Loan Deficiency Payments, Crop Disaster Program, and the Livestock Compensation Program and reflected 20.6 to 32 percent of the reported per capita income in Chouteau County in 2003 (approximately $24,030). In 2004, the per capita income was $27,303, an increase of 23.6 percent from

2002 and 13.6 percent over 2003. Median household income in 2003 was $28,646, only 83.2 percent of the state average (USDA 2006). In 2003, 15 percent of the Chouteau County's population was estimated to be living in poverty (U.S. Census Bureau 2005b).

MATL provided DEQ with tables detailing county revenues and expenditures for the fiscal year ending June 2005 in its March 2006 submittal to the agency (MATL 2006b). In general, property tax made up nearly 50 percent of county revenues in fiscal year 2004-2005. Public works was the largest segment draw on the county budget. For fiscal year 2004-2005, Chouteau County appropriated $1,324,911 to its road fund.

Glacier County

Glacier County is home to the Blackfeet Indian Reservation and also encompasses the eastern portion of Glacier National Park. The presence of the park provides an important tourism draw to the area, which creates a higher degree of economic activity in the retail trade, accommodation and food services, and entertainment and recreation industry sectors. These sectors combined account for more than half the total private workforce, although government jobs, mostly tribal related, provide the greatest amount of employment (Montana Department of Labor and Industry 2005). Health care and social services are also a major industry sector (U.S. Census Bureau 2006), as is the oil and gas industry, which experienced a 150 percent increase in earnings from 2001 to 2004 (Montana Department of Commerce 2006). According to the USDA's 2002 census, 85.8 percent of the land in the county is in farms; although the total number of farms decreased slightly from 493 in 1997 to 472 in 2002.

Per capita personal income in 2004 in Glacier County was $20,637, an increase of 13.4 percent from 2002 (U.S. Department of Commerce 2006). Median household income in 2003 was $27,117 which was only 78.7 percent of the state average (USDA 2006). According to U.S. Census Bureau estimates, in 2003 25.6 percent of Glacier County's population was living in poverty. The only other county in the state with a higher poverty rate was Roosevelt County (U.S. Census Bureau 2005b).

Property tax made up nearly 38 percent of county revenues in fiscal year 2004-2005. Largest segment draws on the county budget include public safety, public works, and general government expenditures; all tapping between 28 to 30 percent of revenue. For fiscal year 2004-2005, Glacier County appropriated $926,559 to its road department fund, $1,124 to the Cut Bank Fire Department fund, and $495,242 to the ambulance fund (MATL 2006b).

Pondera County

Economic data from 2004 indicate that within Pondera County the largest economic sector was education, health, and social services, which employed 302 individuals that year. A report on the economic impact of the health sector in Pondera County (Oklahoma State University 2005) indicated that the bulk of the health care workers (244) are employed by Pondera Medical Center. Retail trade was also a major sector, with approximately 280 employees reported (U.S. Census Bureau 2006). Agriculture was also a large industry within the county with 20.2 percent of individuals employed in that sector. Nearly 75,000 acres of land in Pondera County are irrigated cropland and 86.6 percent of the land is in farms (USDA 2004). Principal crops include winter wheat and barley.

In 2004, the per capita personal income in Pondera County was $23,709, an 8.4 percent increase since 2002 (U.S. Department of Commerce 2006). Median household income in Pondera County was reported to be $29,362 in 2003, or 85.2 percent of the state average (USDA 2006). In 2003, 17.6 percent of Pondera County's population was estimated to be living in poverty (U.S. Census Bureau 2005b).

Property tax made up nearly 50 percent of county revenues in fiscal year 2004-2005. Largest segment draws on the county budget include public works and general government expenditures. For fiscal year 2004-2005, Pondera County appropriated $925,355 to its road fund and $20,891 to its rural fire district fund (MATL 2006b).

Teton County

Based on the U.S. Census Bureau's 2004 county business patterns study, retail trade establishments employ the largest percentage of the workforce in the county, followed by the health care and social assistances (U.S. Census Bureau 2006). However, these statistics do not take into account those establishments without employee identification numbers, which may include some farms. Of all the counties in the Project area, Teton County is the only one actually to see an increase in the number of farms between 1997 and 2002 (from 625 to 700, or 12.5 percent increase). This area of Montana is known for its high quality winter wheat and barley production. Much of the barley produced in Teton County is grown under contract with Anheuser-Busch. Another prominent contractor in the area is General Mills (Chouteau Acantha 2004).

Per capita personal income in 2004 was $26,158. Median household income in 2003 was $30,844, or 89.5 percent of the state average (USDA 2006). During the same year, 13.7 percent of Teton County's population was living in poverty according to U.S. Census Bureau (2005b) estimates.

Taxes and assessments (including property tax) made up nearly 48 percent of county revenues in fiscal year ending 2004. Public safety was the largest segment draw on the county budget. For fiscal year 2004-2005, Teton County appropriated $787,037 to its road fund, $64,893 to its Fire Fee District, $15,000 to its rural fire fund, and $3,245 to the Choteau fire fund (MATL 2006b).

Toole County

The largest economic sector in Toole County was education, health, and social services. Retail trades comprise the second largest employment sector, followed by accommodations and food service. Almost 90 percent of the land area of the county is farmland. Of the 405 farms in Toole County in 2002, 200 were oilseed and grain farms and 110 grew sugar beets, hay, and other types of crops. The remaining farms and ranches were primarily dedicated to beef cattle ranching and other animal production. Oil and gas extraction is also a major economic activity in Toole County, with about 11 percent of total private wages. The county is also home to the busiest port of entry on the Alaska-Canada Highway between eastern Washington and central North Dakota (Montana Department of Labor and Industry 2005).

Per capita personal income in 2004 was $28,100, an increase of 23 percent just from 2002 (U.S. Department of Commerce 2006). Median household income in 2003 was $29,840 which was 86.6 percent of the state average (USDA 2006). According to the U.S. Census Bureau (2005b), an estimated 14.1 percent of Toole County's population was living in poverty in 2003.

Taxes and assessments (including property tax) made up about 39 percent of Toole County revenues in fiscal year 2004-2005, however intergovernmental revenues (state/federal) made up over 55 percent of county revenue that fiscal year. Largest segment draws on the county budget include public health and general government expenditures. For fiscal year 2004-2005, Toole County appropriated $910,275 to its road fund and $88,000 to its ambulance fund (MATL 2006b).

3.13.2.3 Local Resources

Local resources that were examined include emergency and medical services, law enforcement, and fire response. Resources such as housing and schools were not examined in detail because of the relatively low number of employees expected through the duration of Project construction, and the relatively short duration of activities occurring in a given locale make it unlikely that these resources would incur any measurable direct impacts. Service and retail providers that would experience impacts as a result of the construction and operation of the proposed Project or alternatives include lodging, restaurants, and gas stations. The likely principal communities that would serve project workers include Great Falls (Cascade County), Conrad (Pondera County), Cut Bank (Glacier County), and Shelby (Toole County). Each of these towns has lodging and dining options as well as grocers and gas stations.

Cascade County

Emergency and Medical Services: Benefis Healthcare provides care to approximately 225,000 people in a service area covering 15 counties in north-central Montana. Benefis Healthcare offers a full range of medical services, including a Level II Trauma Center. Facilities include 502 beds at its two campuses. Benefis also operates the Williams-Ario Regional Emergency and Trauma Center in Great Falls. This additional facility provides 19 emergency examination rooms and an additional seven non-urgent care rooms. The emergency department is staffed with nine board-certified or -eligible physicians. The Fast track program has four family nurse practitioners who treat non-urgent patients.

Flight services are available through Mercy Flight, which operates both helicopters and airplanes. Mercy Flight crews also respond on-site to bring patients from isolated areas or accident scenes to the Regional Emergency Center.

Law Enforcement: The Cascade County Sheriff's Office covers all areas within the county, with the exception of Great Falls. The Sheriff's office has a force of 34 officers. The City of Great Falls is covered by the City Police Department, with 82 officers and 65 patrol and support vehicles available to handle crime and provide educational services.

Fire Response: The Great Falls Fire Rescue consists of 65 uniformed firefighters, in addition to the Fire Chief, Assistant Chief, and several other staff. All suppression firefighters are certified EMTs, and 19 of them are also certified as paramedics. There are four stations in total. The stations combined have six 1,250-gallon-per-minute fire engines, a water tender, a snorkel truck, a rescue vehicle, and hazardous materials response equipment. Additional fire services in Cascade County include:

- Sun River Fire Service Area
- Vaughn Volunteer Fire Department
- Black Eagle Volunteer Fire Department
- Malmstrom AFB Fire Department
- Gore Hill Volunteer Fire Department
- Cascade Volunteer Fire Department

Chouteau County

Emergency and Medical Services: The Missouri River Medical Center (MRMC) in Fort Benton provides a seven-bed acute care hospital, emergency room, laboratory, and radiology department. The MRMC Emergency room is available 24 hours a day, 7 days a week, and is staffed by a registered nurse with a physician on call. MRMC coordinates emergency services with Memorial Ambulance, Geraldine Ambulance, Benefis Healthcare, Mercy Flight, and Chouteau County.

Law Enforcement: The Chouteau County Sheriff's Office covers the towns of Big Sandy, Loma, Carter, Highwood, Square Butte, Geraldine, and all rural areas within Chouteau County. Fort Benton has its own city police department. The county sheriff's office has a force of nine full time officers and a reserve force of eight and is responsible for the investigation and prevention of crime, coroner duties, fire warden, civil process, bailiff, search and rescue, and emergency services response. Eight patrol cars and two suburbans are available for patrol (MATL 2006b).

Fire Response: There are eight volunteer fire departments within Chouteau County located in Fort Benton, Big Sandy, Geraldine, Highwood, Loma, Carter, Kness, and Elim. There are also five volunteer quick response units on call within the county for emergency and fire situations and three ambulance services. They are located in Fort Benton, Big Sandy, and Geraldine (MATL 2006b).

Glacier County

Emergency and Medical Services: Northern Rockies Medical Center in Cut Bank is a full service medical center with a 25-bed hospital. There are two fulltime physicians, one nurse practitioner, and several registered nurses at the hospital. There are three ambulances in the county (MATL 2006b).

Law Enforcement: The Glacier County Sheriff's Office covers all areas within the county, though Cut Bank has its own police department as well. Glacier County Sheriff's Office has 12 officers and seven reserves. There are 12 vehicles available for patrol. The City of Cut Bank Police Department employs six officers and has five vehicles available for patrol.

Fire Response: Cut Bank Volunteer Fire Department serves the City of Cut Bank and eastern Glacier County. The department has 25 volunteer firefighters, two city trucks, three rural trucks, and a rescue truck. The Cut Bank department also provides equipment and training to the Del Bonita Volunteer Fire Company. There are three rural trucks at this location, but a variable number of volunteer firefighters. Other departments in the county include the Browning Volunteer Fire Department and the Babb Volunteer Fire Department (MATL 2006b).

Pondera County

Emergency and Medical Services: Pondera Medical Center, located in Conrad, is a 20-bed acute care facility with a full range of services. There are five local physicians and five allied staff at the facility along with a variety of visiting specialists. Pondera Medical Center provides 24-hour emergency room coverage staff by a physician assistant and nurse practitioner, with physician backup. Pondera County Ambulance, staffed with emergency medical technicians, serves the Pondera County area with round-the-clock emergency services. The ambulance also provides transportation services for patients to other facilities, as necessary (MATL 2006b).

Law Enforcement: The Pondera County Sheriff's Office covers all areas of the county with the exception of Conrad and reservation lands. The sheriff's office has a force of eight fulltime officers and eight vehicles are available for patrol. Conrad is covered via the City Police Department, with a staff of five and two vehicles available for patrol. The Bureau of Indian Affairs handles law enforcement on reservation lands in the western part of the county.

Fire Response: There are four fire departments throughout Pondera County. These include the Brady Volunteer Fire Department, the Conrad Volunteer Fire Department, the Dupuyer Volunteer Fire Department, and the Valier Volunteer Fire Department. Combined, the four departments have 79 volunteer firefighters and 16 trucks. There is also one department located in Heart Butte that falls under the Bureau of Indian Affairs.

Teton County

Emergency and Medical Services: Teton Medical Center is a 10-bed critical access hospital and 36-bed extended care facility located in Choteau. The hospital provides 24-hour emergency services, with two rooms staffed by physicians, physician assistants, and nurses (MATL 2006b).

Law Enforcement: Teton County Sheriff's Office covers all of the areas within the county. The office has a force of nine, including the sheriff and under sheriff, and nine vehicles available for patrol.

Fire Response: There are five fire departments in Teton County. These include the Choteau Volunteer Fire Department, the Dutton Rural Fire Department, the Fairfield Rural Fire District, the Pendroy Volunteer Fire Company, and the Power Volunteer Fire Company (MATL 2006b).

Toole County

Emergency and Medical Services: Marias Medical Center is a combined 20-bed acute care hospital with nursery, maternity rooms, intensive care and critical care units, and a 68-bed skilled nursing facility. The emergency room has a physician on call 24 hours a day, and a surgeon and anesthestist are available, as needed. The facility has 15 RNs on staff. Four ambulances serve Toole County, including one that is housed in Sunburst (35 miles north of Shelby). There is a helipad at the hospital, and transfers to fixed-wing aircraft can be made at the airport just north of Shelby.

Law Enforcement: Toole County Sheriff's Office covers all of Toole County, including Shelby. The office has a force of 12 including the sheriff and six vehicles available for patrol.

Fire Response: There are two volunteer fire departments located within Toole County. The Shelby Volunteer Fire Department provides fire services for Shelby and southern Toole County and has 21 firefighters, three city trucks, and five rural trucks available. There is also a volunteer fire department that serves northern Toole County located in Sunburst. The department has 21 firefighters, two local trucks, one city truck, one water tender, and five rural trucks available.

3.13.3 Environmental Impacts

The socioeconomic impacts of Alternative 2 and the other action alternatives can be divided into (1) those that are an immediate result of project construction such as an influx of workers to the area to complete the project; (2) those related to operation of the proposed Project or alternatives, such as impediments to property owners' ability to make full and unimpeded economic use of their land and the addition of taxable property to state and county budgets; (3) those that may be anticipated from any corollary energy generation projects that would arise as a direct result of the presence of the proposed Project; and (4) those related to increased availability of power transmission options. Each of these types of effects is discussed in more detail below. Consequences more directly related to the changes that would occur to land use are discussed in more detail in Section 3.1.

3.13.3.1 Alternative 1 - No Action

Under the No Action alternative, neither the proposed Project nor any of the action alternatives would be constructed. Under this scenario, benefits to the counties in the analysis area from project-generated property taxes (see **Table 3.13-11**) and any benefits from the increased utilization of local goods and services would not occur. The employment opportunities that would be created during construction of the project would also not occur. Wind generation projects providing up to 600 MWs of electricity potentially expected to develop as a result of the construction of additional transmission capacity (also described in Section 3.13.3.2) would not be built in the immediate future; revenue to the counties from these projects would not materialize, nor would the associated temporary and permanent employment opportunities.

Benefits of the No Action alternative would be felt by local land owners who would be able to utilize their land without incurring the inefficiencies caused by working around transmission structures. Conversely, local landowners would not receive easement damage payments for the structures.

3.13.3.2 Alternative 2 – Proposed Project

Construction Phase: Approximately 55 employees would be needed to complete the Project within a 6-month timeframe (MATL 2006b). The local impact of construction activity would vary depending on whether the local labor pool is used or whether workers come from out of the region. An unknown number of those workers would potentially be locally procured, while other jobs may require skills that are unavailable in the local labor pool (MATL 2006b). Where local workers are hired, there would be a small but positive effect to local area personal income figures for the duration of construction and potentially a reduction in unemployment in the analysis area's counties. According to MATL (2006b), about two-thirds of the hired construction workers would earn between $20 and $26 per hour and the project would provide in excess of 200,000 person-hours of construction employment. Assuming an average pre-tax hourly wage of $23, construction employment alone may conservatively generate $4.6 million over the construction time period of approximately 6 months. Earned wages from local workers would also be a source of income tax to state and federal taxing authorities, although this revenue may simply represent a replacement of similar revenue amounts generated by jobs previously held by project contractors.

Workers would be dispersed along the chosen alignment, rather than all concentrated in one area at one time (**Table 2.3-3**). For example, some workers would concentrate on digging and setting poles, while other crews would follow at a later time to string line. Similarly, line installation would also be dispersed. Secondary, or induced positive impacts would be created by the increase in use of the local retail business and service industries. However, given the few workers and dispersed nature of the construction activities associated with the proposed Project and action alternatives, it is likely that while the secondary impacts in any given town along the alignment would be beneficial, they would also be small and short term.

No direct impacts to the regional demographics are expected to occur as a result of the project since some of the workers are expected to already be residing in the area and others would be dispersed over the breadth of the Project area. The dispersed nature of the construction phase of the project also means that local goods and services such as lodging facilities, restaurants, and gas stations would not be over-utilized to the degree that additional employment or additional facilities would be required to maintain pre-Project levels of service. Interviews conducted by MATL representatives with other community service workers at hospitals and law enforcement agencies also indicated that these types of services would not be unduly taxed by the influx of workers to the region (MATL 2006b). In addition, construction costs would ultimately be paid for by the energy shippers, not by Montana rate payers.

As described more fully in Section 3.1 (Land Use), the construction phase of the action alternatives would require limited access road development to reach otherwise inaccessible tower locations, overland driving to geographically accessible locations, and other activities related to structure placement. Temporary disruptions would occur to landowners, including brief inaccessibility to portions of their property in the right of way. Heavy equipment use along the right of way would create noise (discussed in Section 3.12), dust, and exhaust that may create a temporary nuisance to property owners working or residing close to the construction activities. Economic costs associated with such disruptions would be minimal due to the brief time required at each construction location.

Operation Phase: Portions of the proposed Project would be constructed on easements crossing irrigated and non-irrigated cropland and rangeland. Disruptions to farming practices would be expected to occur, including

- Decreases in farming efficiency caused by pole placement through fields;
- Increases in herbicide and pesticide spraying costs;
- Reduced coverage of aerial herbicide and pesticide resulting in increased weed pressure;
- Disruptions to GPS-driven equipment; and
- Reduced property values.

Because action alternatives are located in areas accessible by overland driving, few permanent access roads would be needed. However, where repeated compaction by heavy equipment occurs over fine-grained soils, previously productive cropland may require additional labor measures (such as tilling) to restore crop productivity to pre-construction levels.

Disruptions such as these would result in external costs associated with the creation of non-productive areas, extra diesel, pesticides and herbicides, modifications to GPS networks infrastructure (that is, repeater installation/modification and tractor modifications), additional stress and increased flight time during aerial applications of fertilizer and pesticides due to the presence of tower and conductor obstructions, and real or perceived impacts to property values (MATL 2006b). Few recent studies are available that quantify the cost of these types of infringements to property owners with agreed-upon accuracy; however, a study conducted by Ontario Hydro in 1979 showed that the greatest financial effect of the towers comes as a result of the creation of a non-productive area, followed by time loss, crop damage, and material loss (Scott 1980). While the Ontario Hydro study attempted to quantify these losses, the values presented in the study are in terms of the averages between 1974 dollars for western Ontario and 1975 values for eastern Ontario. Therefore, it would be difficult to convert these monetary values to today's U.S. dollar value for the specific types of farm and ranchland uses in northern Montana . However, in terms of net impact, pole payments for each structure and annual payments to offset the increased cost of farming around the structures made by the Project proponent to the landowner would provide monetary mitigation for these economic losses. These payments also provide a new, predictable, and consistent revenue stream to landowners.

Property values depend on many factors, and it is not possible to assign definite figures to potential reductions in property values. A review of recent studies indicates that property values could decrease slightly, might not change, or may increase (EPRI 2003). Some reduction in property values due to the presence of the transmission line could occur as a consequence of the visual externalities of the towers, perceived health risks associated with high voltage, and effects on farming efficiency. Property devaluation would likely be more evident on properties immediately adjacent to the line, particularly those where residences are close, or the land is farmed. However, most of the MATL line extends across remote ranch and cropland. For these properties, devaluation based on visual impacts or perceived health risks would be negligible and any reduction in value due to the loss of productive land or farming efficiency would be at least partially off-set by negotiated compensation.

MATL proposes to use experienced operations and maintenance (O&M) contractors, possibly outsourced from other regionally-located utility companies, for ongoing maintenance of the transmission line once it is constructed. This may provide additional employment opportunities if the selected contracting company does not currently have the personnel resources to meet MATL's O&M requirements. The number of employees that would potentially be hired is unknown at this time; however, the estimated wages for such personnel are expected to be in the $25 per hour range (Pfister 2007). A small number of new residents working on the MATL project might move into the study area as a result of the transmission line.

In Montana, property tax is the primary source of funding for local governments. The Project would be centrally assessed (as a single unit) at 12 percent, then the revenue would be apportioned to different districts based on mileage of line within each district. Property taxes assessed on the Project would include the value of the line and in cases where MATL purchases rights of way, the property would also be included in the value (otherwise, the existing landowner continues to be responsible for property taxes on the land). Applicable mill levies would also be applied to the property taxes paid within each district. The approximate amount of property taxes potentially available to each county within the analysis area was calculated based on an estimated value of $363,284 per mile and the approximate mileage of the proposed alignment and projected alternatives (Mullen 2006). As shown in **Table 3.13-11,** tax revenue from the line may generate from $121,688 in Chouteau County to a little over $1 million in Pondera County. Since property taxes associated with the transmission line are centrally assessed, they are tied to project revenue rather than the age of individual or collective infrastructure components. Therefore, as long as the line is utilized and maintained, no depreciation is expected to occur and the tax revenue benefits available to each county are expected to remain unchanged over time (Dodds 2006).

In addition to property taxes, the Project would also be subject to the Wholesale Energy Transaction Tax (WET), which is imposed by the State of Montana at a rate of $0.00015 per kilowatt hour (kWh). Revenue generated from this source is directed to the state's general fund, which is distributed to projects (primarily school districts) throughout the state (Dodds 2006).

Increased Availability of Power Transmission Options: The operation of additional energy transmission lines in Montana is expected to provide an additional avenue for transferring energy between Montana and Canada. Without this or other future transmission lines, for power to travel between Montana and Alberta, that power must first go through Idaho, Washington, and British Columbia. Energy shippers incur additional transmission tariffs that would not be incurred if the MATL line were constructed. At the time of this study, MATL had recently announced that the expected permitted firm capacity of the Project had sold out (MATL 2006b). Increased energy transactions along with more efficient paths of conveyance could increase the competition between suppliers and potentially result in lower rates to electricity consumers. However, the amount of transmission capacity that the MATL line would open up between Montana and Alberta would be relatively small compared to the total amount of interconnection capacity Montana currently has with other states. Therefore, it is likely that both potential increases in competition and potential decreases in electricity prices as a result of the proposed line would be limited or non-existent.

Conversely, PPL Montana is the largest supplier of Montana-consumed energy. Following the state's deregulation in 1997, FERC gave PPL Montana the authority to sell electricity at substantially higher market-based rates rather than the less-expensive cost-based rates. Thus there may not be any consumer benefit brought about by the proposed Project in terms of Montana electricity consumers receiving lower rates.

Corollary Energy Generation Projects: Additional socioeconomic impacts that would be incurred as a result of new energy generation projects enabled by the existence of the proposed MATL line would be similar to those described here for the MATL line. For example, each new project would include the beneficial impacts realized by local economies due to the presence of construction and operation workers moving to the region and each project's potential utilization of local labor pools. These benefits would increase local employment opportunities and increase local economic transactions as these workers and their families draw upon service and commodity providers. Each new project would also create new facilities subject to state and local taxation, thus further increasing each county's tax revenue. Benefits may also be realized to the rate payer due to increased competition and abundant energy supplies that may become available as new wind generation facilities come on-line. However, each new generation facility would also require land commitments that could remove a small amount of land from production. The lease payments for wind sites are considered to be higher than the value of the land removed from crop and cattle production. These new projects also would provide a new revenue stream to landowners.

3.13.3.3 Alternatives 3 and 4 – MATL B and Agency Alternative

The socioeconomic impacts described above are essentially equal for all of the alternatives with the exception of differences in the estimated property tax revenue available to each affected county depending on the mileage of the line that would ultimately be constructed within each county's jurisdiction (**Table 3.13-11**).

3.13.3.4 Environmental Justice

Executive Order 12898 states that all federal actions must evaluate a project relative to minority and low-income populations to ensure that these groups are not disproportionately impacted by adverse health and environmental consequences of a proposed Project. The proposed Project requires permits from the federal government and must satisfy this directive.

MATL conducted an assessment of environmental justice issues in accordance with standard practices set forth by the U.S. EPA (1998) and provided the findings in their MFSA application to DEQ (MATL 2006b). Based on their findings, no specific minority or low-income populations are crossed within the Project analysis area. As presented in the application document, significant impacts for this project are assessed relative to three criteria:

- Criterion 1: An alternative is sited to disproportionately negatively affect low-income or minority populations;
- Criterion 2: An alternative disproportionately reduces the ability of low-income or minority persons to make a living;
- Criterion 3: Native American cultural or religious sites are irreparably damaged or destroyed.

TABLE 3.13-11 TAX BENEFIT ESTIMATES							
	Alignment Length (Miles)	Value $/Mi.	Estimated Value in County (BxC)	Class 9 Tax Rate (Valuation Ratio): 12%	Taxable Value (DxE)	Avg. Rural Mill Levy	Property Tax (FxG)
Cascade							
Alternative 2	12.76	$363,284	$4,635,504	0.12	$556,260	0.50412	$280,422
Alternative 3	12.31	$363,284	$4,472,026	0.12	$536,643	0.50412	$270,533
Alternative 4	19.81	$363,284	$7,196,656	0.12	$863,599	0.50412	$435,357
Chouteau							
Alternative 2	5.87	$363,284	$2,132,477	0.12	$255,897	0.43959	$112,490
Alternative 3	10.21	$363,284	$3,709,130	0.12	$445,096	0.43959	$195,660
Alternative 4	0	$363,284	$0	0.12	$0	0.43959	$0
Glacier							
Alternative 2	40.41	$363,284	$14,680,306	0.12	$1,761,637	0.53745	$946,792
Alternative 3	37.34	$363,284	$13,565,025	0.12	$1,627,803	0.53745	$874,863
Alternative 4	40.56	$363,284	$14,680,306	0.12	$1,761,637	0.53745	$946,792
Pondera							
Alternative 2	45.69	$363,284	$16,598,446	0.12	$1,991,814	0.52162	$1,038,970
Alternative 3	44.44	$363,284	$16,144,341	0.12	$1,937,321	0.52162	$1,010,545
Alternative 4	52.01	$363,284	$18,894,401	0.12	$2,267,328	0.52162	$1,182,684
Teton							
Alternative 2	25.16	$363,284	$9,140,225	0.12	$1,096,827	0.4991	$547,426
Alternative 3	17.32	$363,284	$6,292,079	0.12	$755,049	0.4991	$376,845
Alternative 4	27.26	$363,284	$9,903,122	0.12	$1,188,375	0.4991	$593,118

Notes:
Sources: Mullen 2006
Montana Department of Revenue 2004

MATL's findings relative to Criterion 1, based on comparing U.S. Census block-level data (the smallest geographic unit for which the U.S. Census tabulates data), show that ethnic and economic demographics are relatively similar among the alternatives and between all of the alignments and the surrounding comparison communities with the exception of the Blackfeet Reservation to the west of the Project analysis area. The percentage of Native Americans on the Blackfeet Reservation and the poverty level are much higher than in the general comparison region. In addition, Heart Butte, which is in the region but not within the Project analysis area, is a low-income and minority community. High poverty levels in other parts of the Project analysis area, such as western Toole County, are not related to specific communities but rather to generally low-paying jobs in a dispersed rural environment. None of the alternatives negatively affect low-income and/or minority populations in a disproportionate manner to the surrounding communities or region; consequently, there is no significant impact relative to Criterion 1 (MATL 2006b).

MATL's findings relative to Criterion 2 show that employment in the Project analysis area is related to dispersed activities such as farming, ranching, or commuting to jobs in surrounding towns and cities. Construction of the transmission line could result in short-term employment opportunities for the local workforce. None of the alternatives would disproportionately reduce the ability of low-income or minority populations to make a living, resulting in no impacts relative to Criterion 2 (MATL 2006b).

Impacts to cultural and religious sites within the Project study area are described in Section 3.14. No impacts relative to Criterion 3 would occur as a result of the proposed Project or the other action alternatives.

3.14 Paleontological and Cultural Resources

3.14.1 Analysis Methods

Paleontological and cultural resources provide valuable information about the behavior of past plant, animal, and human populations and their environments. Paleontological resources are fossilized plant and animal remains that are rare and have scientific research value. Cultural resources include archaeological sites, historic sites, architectural properties, traditional cultural properties, districts, landscapes, structures, features, or objects resulting from human activity. Both resources are nonrenewable and irreplaceable, and, for state-owned land, Montana state law requires that inventory for and evaluation of these resources occur before they are impacted by ground disturbing activities or removed from state ownership.

Federal regulations that were considered for this analysis include the National Historic Preservation Act of 1966, the Archaeological and Historic Preservation Act of 1974, the Archaeological Resources Protection Act of 1979, the American Indian Religious Freedom Act of 1977, the Native American Graves Protection and Repatriation Act of 1990, and Executive Orders relevant to cultural resources. State legislation considered includes the Montana Antiquities Act and the Montana Human Remains and Burial Site Protection Act.

Known prehistoric cultural resource sites (hundreds to thousands of years old) and historic sites (at least 50 years old) have been documented in the project area. The number and variety of sites increases through time due to population increases and the effects of immigration. Existing sources of information were consulted in order to analyze paleontological and cultural resources, as described below.

Information Resources

The Montana Antiquities Database maintained by the Montana State Historic Preservation Office (SHPO) in Helena was the primary source for information about specific cultural resource sites and paleontological localities in the project study area. The Cultural Resources Information System (CRIS) contains summary information about previously recorded resources by site type and township, range, and quarter section. The Cultural Resources Annotated Bibliography System (CRABS) contains listings of previous resource inventories by township, range, and section. A search for sites listed in the National Register of Historic Places was conducted through SHPO and on line through the National Park Service, as appropriate.

A variety of literature references including Frison (1991, 2001), Greiser (1984, 1994), Hanna (2003), Malone and Roeder (1976), Montana State Engineer's Office (1964), Montana Water Resources Board (1969), Schwantes (1996), Toole (1959), and Walker and Sprague (1998) were used in preparation of sections of this environmental review related to paleontology, prehistory, and history. Information from a Class I cultural resources inventory (Petersen and Ferguson 2006) was also incorporated.

Analysis Area

The analysis area for paleontological and cultural resources is at least 480 square miles with a research area extending 2 miles to either side of the proposed and alternative alignments (figures showing these alignments are provided in Chapter 2).

In the Great Falls area, the lacustrine basins and related features are interspersed with areas of nearly level to steep soils on terraces, fans, and benches mixed with strongly sloping to steep soils on dissected sedimentary bedrock plains and hills. From just north of the Cascade County line to the Canadian border, the analysis area crosses the undulating to strongly rolling topography of the Glaciated Missouri Plateau section of the Great Plains physiographic province. This part of the area is also interspersed with nearly level soils in lacustrine basins surrounded by strongly sloping soils on terraces, fans, and benches. The lush grasslands once found in the area during much of the prehistoric past provided sufficient food for large herds of bison, antelope, and deer, with elk found in or near forested areas closer to the mountains or in the river breaks. These animals were not only food sources, but also provided materials for clothing, tools, and shelter. Grizzly and black bear were likely common and there was a wide variety of game birds and migratory water fowl. Other plant resources would provide roots, bulbs, fruits, berries, greens, and leaves for eating, making teas, and for medicinal purposes. Stone material left behind by glaciers or exposed by erosional episodes was used for hide anchors on tipis, piled for use as cairns or alignments for animal drive lines, and worked into stone tools.

Cultivation of much of the analysis area for more than the past century has impacted many of the shallow prehistoric cultural resource sites such as tipi rings or campsites in areas of little soil development. Intact prehistoric sites can be anticipated in areas of deep spoils either on terrace or bench surfaces or in drainages where redeposited soils would protect them. Historic homestead, farm, or ranch buildings or foundations and related features or structures might be more visible in the agricultural areas.

3.14.2 Affected Environment

Paleontological Sites

A fossil is defined as the remains, trace, or imprint of a plant or animal that has been preserved in a geologic context. These fossils are grouped into categories including: trace, plant, invertebrate, fish, amphibian, reptile, dinosaur, bird, mammal, and vertebrate. A trace fossil (ichnofossil) is a track, trail, burrow, or tube formed by the activity of an animal. Coprolites, or fossilized dung, are also trace fossils. Fossilized plants occur as physical remains (petrified wood) or imprints (leaf impressions). Stromatolites (laminated algal mounds) and cyanobacteria (blue-green algae) are included in the plant category. Invertebrates are animals without backbones that inhabit marine, freshwater, and terrestrial environments, and are also found in the study area.

The geologic formation with the highest probability of containing fossils is the Two Medicine Formation. The only other formations with low to moderate probability of containing fossils include the Eagle, Kootenai, and Virgelle. The remaining formations or geologic types within the study area have little or no potential to contain fossils. Areas within the Two Medicine, Eagle, Kootenai, and Virgelle formations with potential to contain fossils primarily occur on steep exposed slopes above major river channels north from the Conrad area. In general, the distribution of fossils has not been determined at other locations within the Project study area since most of the Cretaceous rocks are covered by 1 to 15 feet of glacial deposits and no paleontological fieldwork is reported. However, the likelihood of encountering new fossil types of significance to the scientific community is thought to be low because of the low amount of disturbance to deeper layers.

Cultural Sites

Known historic site types in the analysis area likely include: exploration and overland migration sites such as trails (likely Native American in origin), river fords, wagon roads, encampments, or geologic/geographic landmarks; inscriptions including pictographs, petroglyphs, or tree carvings; transportation sites such as late nineteenth-early twentieth century roads, railroad engineered features (bridges, trestles, ballast, track and ties) and construction camps; isolated trapper cabins; homesteading, ranching, and farming sites such as residences (including foundations), outlying buildings and structures, cultural landscape elements (including fences, field/pasture patterns, stock ponds and dams, stock trails and river fords), irrigation structures, and artifact scatters; mining and mine related sites; and abandoned town sites including foundations and trash dumps.

Summary of Previously Recorded Data

A Class I review of previously recorded cultural resources and previous cultural resource inventories for the MATL analysis area indicates that there are known prehistoric and historic cultural resources in or near alternatives 2 and 3 (Petersen and Ferguson 2006). An additional Class I search for previously recorded cultural resources in sections containing Alternative 4 was conducted in November 2006. All information is summarized in **Table 3.14-1**. The searches are computerized searches of records maintained by the SHPO using township, range, and section legal descriptions. The resulting data indicate the presence or absence of cultural resources in a section but not necessarily on the alignment of a specific alternative.

TABLE 3.14-1
RESULTS OF CLASS I INVENTORY

Alignment	Consensus Determination of Eligibility	No Determination or Unknown Eligibility	Not Eligible (Determined by SHPO)
Alternative 2 Prehistoric Sites			
Tipi Ring Sites	24PN24	24TT1008 24PN21 24PN5 24GL55	24PN112
Buffalo Jumps	--	24GL348 24GL587	--
Cairn Sites	--	24GL1032	--
Historic Sites			
Historic Road/Trail	24CA416	24CA645 24PN83	--
Railroads	24GL191	--	--
Railroad/Stage routes	24PN114	24PN34	--
Bridges	--	24PN46	--
Homesteads/ Farmsteads/ Residences	--	24PN119	--
Irrigation Systems	24PN109, 24PN111	24PN88	--
Alternative 3 Prehistoric Sites			
Tipi Ring Sites	24PN24	24PN21 24GL55	--
Buffalo Jumps	--	24GL348 24GL587	--
Cairn Sites	--	24GL1032	--
Historic Sites			
Historic Road/Trail	24CA416	--	--
Railroads	24GL191	--	--
Railroad/Stage routes	24PN114	--	--

TABLE 3.14-1 RESULTS OF CLASS I INVENTORY			
Alignment	**Consensus Determination of Eligibility**	**No Determination or Unknown Eligibility**	**Not Eligible (Determined by SHPO)**
Bridges	--	24PN46	--
Homesteads/ Farmsteads/ Residences	--	24PN82	24PN115 24PN116
Irrigation Systems	24PN87, 24PN109, 24PN111	--	--
Historic Oil Refinery	24PN117	--	--
Unknown Historic	--	24TT1006 24PN20	--
Alternative 4 - Segments Prehistoric Sites			
Tipi Ring Sites	--	24CA194 24CA195 24CA196 24TT1008 24PN773 24PN61	--
Lithic Scatter	--	24CA192 24CA193	--
Camp Site	--	24CA445 24CA494	--
Historic Sites			
Historic Road/Trail	24CA416	24PN83	--
Railroads	24GL191	--	--
Homesteads/ Farmsteads/ Residences	--	24CA190 24CA191 24CA199 24PN91 24PN95	--
Irrigation Systems	--	24PN551 24PN88	--
Historic Trash Dump	--	24PN62	--
Mining	--	24CA976	--
Historic Transmission Line	24CA1040	--	--

Note: -- No reported site

In total, nine sites, one prehistoric and eight historic, are eligible for the NRHP on the basis of consensus determination between the SHPO and a lead federal or state agency. Cascade County contains the eligible Rainbow Dam Road 24CA416, which is located in sections containing alternatives 2, 3, and 4. Site 24PN24 is an eligible tipi ring site along both Alternative 2 and Alternative 3 in Pondera County. Sites 24PN109 and 24PN111 are historic irrigation systems located in Pondera County intersecting Alternative 2 and 3. Two eligible sites located in Pondera County are an historic railroad (24PN114), along Alternative 2 and 3 and an historic oil refinery (24PN114) along Alternative 3. Site 24GL191 is the Great Northern Railroad; now part of the Burlington Northern-Santa Fe, located in Glacier County along alternatives 2, 3, and 4. While the exact route of the Lewis and Clark National Historic Trail through the analysis area has not been identified, it is known that it followed the Marias River and is a resource of concern.

3.14.3 Environmental Impacts

Paleontological Resources

As part of MATL's mitigation program, pre-construction reconnaissance would be conducted in areas where potential paleontological or fossil discovery exists. If found, fossil data would be recorded by trained professionals (with landowner permission). Under these conditions, the project may result in the beneficial impact of unknown, or little studied fossils being discovered (MATL 2006b).

Direct effects to paleontological resources from development projects such as MATL include earthmoving or ground clearing activities, blasting of bedrock for tower foundations or access roads, boring for geotechnical surveys or placement of guy wires, and pedestrian or vehicular traffic. Indirect effects of projects such as MATL include access to areas that were formerly not accessible. Access can lead to intentional damage to paleontological resources such as unauthorized collecting, theft, and defacement, and result in the loss of information and destruction of the resource. An unanticipated discoveries plan that addresses discovery of paleontological resources in high probability areas during construction would be developed prior to project implementation (see **Appendix F**).

Cultural Resources

Previous cultural resource inventories and/or recording of properties in the broader MATL study area resulted in no properties listed in the NRHP being located on any of the alternative alignments. A segment of one NRHP-listed property, the Mullan Road (24CA89), is reportedly located in a section adjacent to the southern end of Alternatives 2 and 3 on the Benton Lake National Wildlife Refuge. This cultural resource site has never been located and recorded on the ground. It is recommended that if either alternative is selected the area be thoroughly reviewed for intact portions of the property.

The recommended treatment of either NRHP-listed or eligible cultural resource properties is avoidance, if at all possible, and protection. Many of the known, NRHP-eligible cultural resource sites within or crossed by the various alternatives are either limited in size or are linear sites. Direct impact to these sites can likely be avoided by adjusting the location of individual structures and roads.

Locations of Traditional Cultural Properties or potential locations identified by knowledgeable tribal members should be avoided. Traditional Cultural Properties or sacred sites are places that have traditional spiritual values for Montana Native people (Indian tribes or Indian religious practitioners) that are reverently dedicated to a person or object or event or activity and are secured against violation or infringement or interference.

In order to protect and preserve Indian religious practices, Executive Order 13007 and other laws and Executive Orders of the U.S. Government require that, to the extent practicable, permitted by law, and not clearly inconsistent with essential agency functions, agencies should accommodate access to, and ceremonial use of, Indian sacred sites by Indian religious practitioners; avoid adversely affecting the physical integrity of sacred sites; and where appropriate, maintain the confidentiality of sacred sites.

In the MFSA application, MATL stated that during a meeting Blackfeet Tribal representatives stressed the need to evaluate the proposed Project's potential to impact traditional landscape and land use values. Inclusion of tribal monitors during cultural surveys and/or review of cultural resource findings by Tribal Historic Preservation Office (THPO) personnel were suggested to assist in appropriate treatment of prehistoric findings.

Cultural resource properties where the NRHP eligibility is unknown, has not been determined, or is unresolved can either be avoided, if possible, or subjected to sufficient investigation to determine or resolve eligibility.

If Alternative 2, 3 or 4 is selected, then unevaluated cultural resource properties along the alignment should be individually evaluated in terms of Project effect. In addition, an intensive cultural resource inventory of areas not previously inventoried to Montana SHPO standards would be necessary to comply with regulations in the Montana Antiquities Act, as amended (1995). Portions of a selected alternative along or within one-half mile of rivers, flowing streams, lakes, springs, or seeps should be considered high probability areas especially for prehistoric cultural resource sites. Such areas may also be more likely to contain historic sites, although intact homesteads may be more broadly distributed based on the system of patenting land in the late nineteenth and early twentieth centuries. Certain topographic features, such as those conducive to buffalo jump sites or high points for observation, should also be considered likely areas to contain prehistoric sites.

Areas least likely to contain cultural resource sites or NRHP-eligible sites are those areas far from reliable water and those areas where food or tool making resources would not occur. While areas subjected to plowing for farming may be less likely to contain intact cultural resource sites, plowed areas of well-developed soil may still contain intact prehistoric cultural resources.

Direct effects to cultural resource sites from development projects such as MATL include earthmoving or ground clearing activities and pedestrian or vehicular traffic. There is the potential for visual impacts to above-ground resources, such as historic buildings or houses. Indirect effects of projects such as MATL include soil erosion from earthmoving activities and access to areas that were formerly not accessible. Access can lead to intentional damage to cultural resource sites such as looting and vandalism, including unauthorized relic collecting, theft, and defacement, and result in the loss of information and destruction of the resource.

An unanticipated discoveries plan that addresses discovery of artifacts or cultural resource sites during construction would be developed prior to project implementation (see **Appendix F**).

3.14.3.1 Alternative 1 – No Action

Under the No Action Alternative, the MATL project would not be constructed. Thus there would be no impacts to cultural resources or any Traditional Cultural Properties.

3.14.3.2 Alternative 2 – Proposed Project

The Class 1 cultural resource searches resulted in the identification of six previously recorded sites considered eligible for the NRHP in sections along Alternative 2. These sites include the Rainbow Dam Road, the Burlington Northern-Santa Fe Railroad, one other historic railroad, a large tipi ring site, and two historic irrigation systems. There are 13 sites where NRHP-eligibility has not been determined, is unknown, or is unresolved. This group includes four tipi ring sites, two buffalo jump sites, a prehistoric site consisting of stone cairns, two historic roads or trails, a railroad, a bridge, a homestead, and an irrigation system. There is one previously recorded tipi ring site that was determined not eligible for the NRHP.

3.14.3.3 Alternative 3 – MATL B

The Class 1 cultural resource searches resulted in the identification of seven previously recorded sites considered eligible for the NRHP in sections along Alternative 3. These sites include the Rainbow Dam Road, the Burlington Northern-Santa Fe Railroad, one other historic railroad, a large tipi ring site, an historic oil refinery, and two historic irrigation systems. There are nine sites where NRHP-eligibility has not been determined, is unknown, or is unresolved. This group includes two tipi ring sites, two buffalo jump sites, a prehistoric site consisting of stone cairns, an historic bridge, a homestead, and two sites only described as historic. There are two previously recorded homestead or residence sites that were determined not eligible for the NRHP.

3.14.3.4 Alternative 4 – Agency Alternative

The Class 1 cultural resource searches resulted in the identification of three previously recorded sites considered eligible for the NRHP in sections along Alternative 4. These sites include the Rainbow Dam Road, an historic transmission line, and the Burlington Northern-Santa Fe Railroad. There are 20 sites where NRHP-eligibility has not been determined, is unknown, or is unresolved. This group includes six tipi ring sites, two lithic scatter sites, two prehistoric camp sites, an historic road or trail, five homesteads, two historic irrigation systems, one historic trash dump, and one historic mining site.

3.15 Visuals

3.15.1 Analysis Methods

Analysis Area

The visual resource analysis was developed using a resource analysis area 1 mile on either side of the proposed transmission line alternatives.

Information Sources

Visual resources refer to the natural and man-made features in the project site analysis area landscape and include cultural and historic landmarks, landforms of particular beauty or significance, water surfaces, and vegetation. Together, these features form the overall impression that a viewer receives of an area or its landscape character.

Data and information for this section were compiled and refined from a variety of sources and verified by ground reconnaissance by Montana Alberta Tie, Ltd. during July and August 2005. Additional ground reconnaissance was conducted during May 2006 by DEQ and Tetra Tech. Additionally, aerial photographs were used to validate, change, or add to existing CAMA residential location information. Some of this information was originally compiled by AMEC Earth and Environmental for the MFSA application (MATL 2006b) and confirmed for use in this analysis.

Visual environmental impacts were analyzed in part by using computer generated photographic simulations. Technical information about these photographic simulations is provided in **Appendix L**.

3.15.2 Affected Environment

Landscape Character

The Project area is located in the Northwestern Glaciated Plains ecoregion (Nesser and others 1997) and is characterized by level to gently rolling glaciated plains crossed by alluvial corridors of the Marias and Teton rivers and their tributaries. Both dryland cultivation and irrigated cropland are common throughout the Project area (Montana Environmental Quality Council 1972). This agricultural land base gives the landscape its characteristic and dominant patterns of linear strips of dryland cultivation and circular and rectangular shapes associated with irrigated fields. Field colors that change seasonally among greens, yellows, and browns accentuate these strong landscape patterns. Scattered parcels of rangeland and native grassland found in steeper coulees and rough terrain throughout the Project area provide additional color and texture in the viewed landscape.

Alluvial floodplains of the Marias and Teton rivers provide more topographic relief and diverse vegetation than surrounding uplands and plains. Mature cottonwood stands, riparian undergrowth of willows, boxelder, and chokecherry, eroded rock formations on valley walls, and meandering river channels contribute to a higher scenic quality in these floodplain corridors. In addition to these alluvial corridors and rivers, area lakes such as Benton and Hay lakes and Black Horse Lake, which is ephemeral, provide another type of water feature in the Project area. Scattered prairie potholes and wetlands dominated by trees, shrubs, emergents (cattails, bulrush), mosses, or lichens are also found in the Project area.

The cultivated and rural landscape provides the dominant cultural setting for the Project area. Rural farms and ranches dot the landscape, increasing in density where irrigation is present. Developed commercial and residential settings are found at small communities like Power, Dutton, and Brady, and the larger communities of Cut Bank and Conrad. Great Falls, at the southern edge of the Project area, is the only urban setting. Visual linear elements, including Interstate 15, state and local roads, railroads, and transmission lines crisscross the region, providing transportation and energy links for residents and commercial use. Other cultural modifications include the scattered oil and gas fields in the northern portion of the Project area and radio towers near Cut Bank and Great Falls. With the visual dominance of dryland and irrigated cultivation throughout the Project area, scenic integrity is high. Although cultural modifications and industrial development are present and visible in typical views, these modifications are typically subordinate to the predominant agricultural landscape.

Views are typically expansive throughout the entire Project area, extending across rolling uplands and plains to the Rocky Mountain Front and island ranges such as the Sweet Grass Hills and Highwood Mountains. Only in the alluvial valleys of the Teton and Marias rivers, their tributaries, and in steep coulees with some degree of topographic relief do views become more enclosed and limited.

Landscape Rating Units and Scenic Quality

The analysis area has been subdivided into landscape units for rating purposes. The rating areas (provided below) were delineated on a basis of: (1) like physiographic characteristics; (2) similar visual patterns, texture, color, variety, and other features; and (3) areas that have similar impacts from man-made modifications.

The scenic quality of each of the landscape units is provided at the end of each unit description. Scenic quality is a measure of the visual appeal of a tract of land or scenic quality rating unit. Scenic quality rating units can be assigned an A (outstanding), B (above average), or C (common) rating based on the apparent scenic quality, which is determined using seven key factors: landform, vegetation, water, color, adjacent scenery, scarcity, and cultural modifications. No Class A areas are present. Those areas classified as Class B are shown on **Figures 3.15-1, 3.15-2,** and **3.15-3**.

Alluvial Corridors

This unit constitutes narrow strips of land following coulees, creeks, and major rivers crossing the visual analysis area. The unit is moderately diverse in terrain, vegetation, and water features. Corridors along coulees and creeks in the analysis area are designated as Class C. The Marias River corridor and the Teton River corridor are designated as Class B due to expansive floodplains, diverse vegetation patterns, river meanders, and topographic relief present in the setting.

Wetland Areas

Wetlands found in the visual analysis area include:

- permanently flooded lakes and reservoirs, and intermittent lakes;
- wetlands found along creek channels and coulees and in association with prairie potholes; and
- wetlands that have natural or artificial channels and periodically or continuously flowing water such as the permanently flooded river channel bottoms associated with the Marias and Teton rivers.

Figure 3.6-1 shows the location of all mapped wetlands within the MATL Project study area. Most wetlands provide diverse vegetation and have low landform diversity and are designated as Class C. The wetlands associated with the Marias and Teton rivers are designated as Class B.

Rims, Ridges, and Buttes

Several rims, ridges, and buttes occur in the Project study area. Prominent features include Lookout Butte, Abbott Ridge and Trunk Butte south of Cut Bank, West Knob and East Knob north of the Teton River in Chouteau County, Teton Ridge, and the Sun River/Missouri River Rim in the southern Project study area. These features are designated Class C because they offer less vegetation diversity than the Class B areas shown on **Figures 3.15-1**, **3.15-2**, and **3.15-3** and little visual variety.

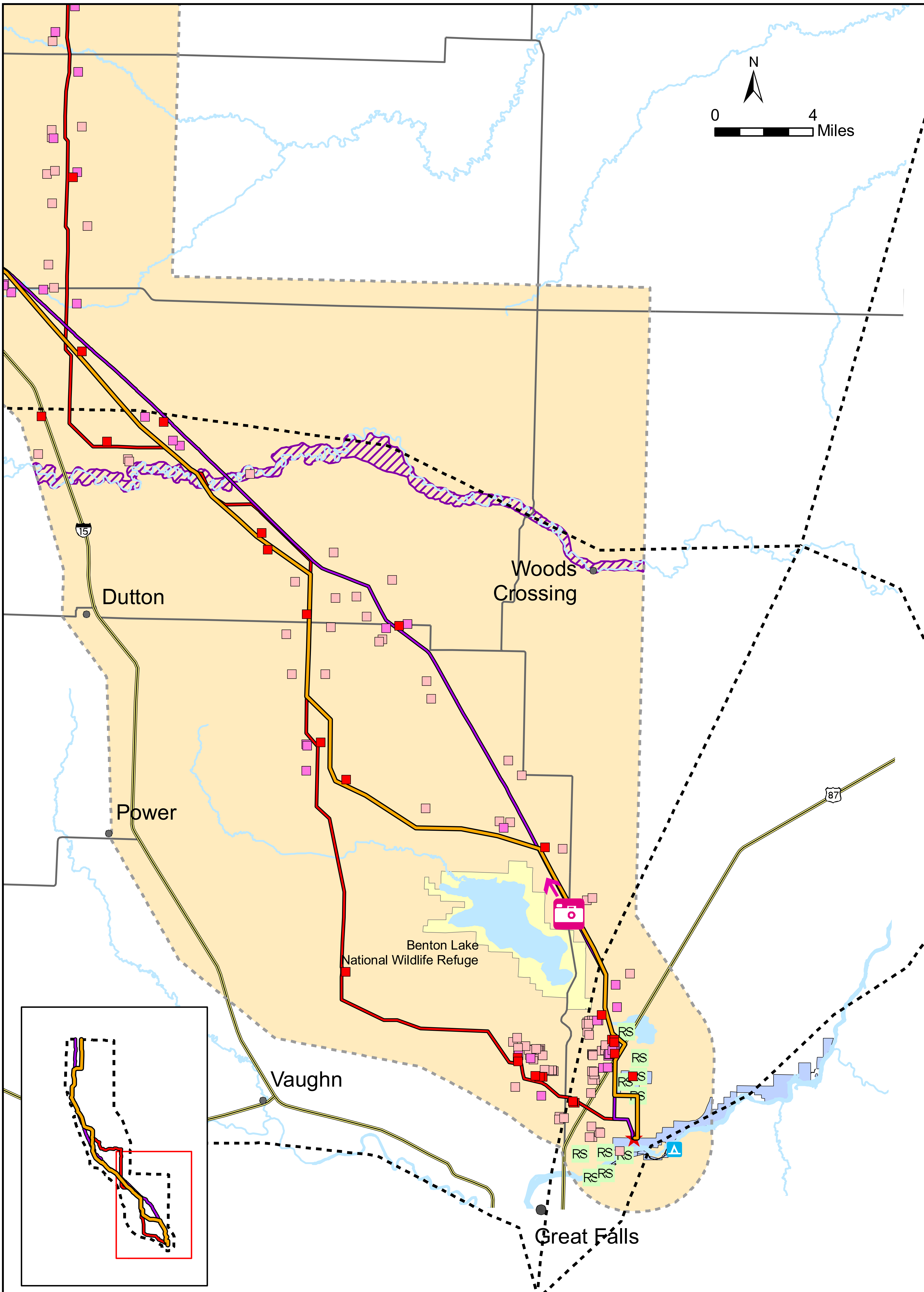


FIGURE 3.15-1 LOCATIONS OF VISUAL IMPORTANCE SOUTH

LEGEND

- HOUSES WITHIN 1/4 MILE OF ANY ALTERNATIVE
- HOUSES BETWEEN 1/4 AND 1/2 MILE OF ANY ALTERNATIVE
- HOUSES BETWEEN 1/2 AND 1 MILE OF ANY ALTERNATIVE
- LEWIS AND CLARK CAMPSITES
- RS RECREATION SITES
- LEWIS AND CLARK TRAIL
- VISUAL SIMULATION POINTS WITH CAMERA ANGLE
- ALT2 - ALIGNMENT
- ALT3 - ALIGNMENT
- ALT4 - ALIGNMENT
- VISUAL QUALITY CLASS B AREAS
- BENTON LAKE NATIONAL WILDLIFE REFUGE
- LANDS MANAGED BY MT DEPT. FISH, WILDLIFE AND PARKS
- CITIES AND TOWNS
- ALIGNMENT END AND EXIT POINTS
- STUDY AREA
- MAJOR HIGHWAYS
- SECONDARY ROADS
- RIVERS AND STREAMS

NOTE:
ALT = ALTERNATIVE

GIS map by Ed Madej -TTEMI-HE Fig3_15-1_MATL_visual_mpacts_south_part_012007.mxd

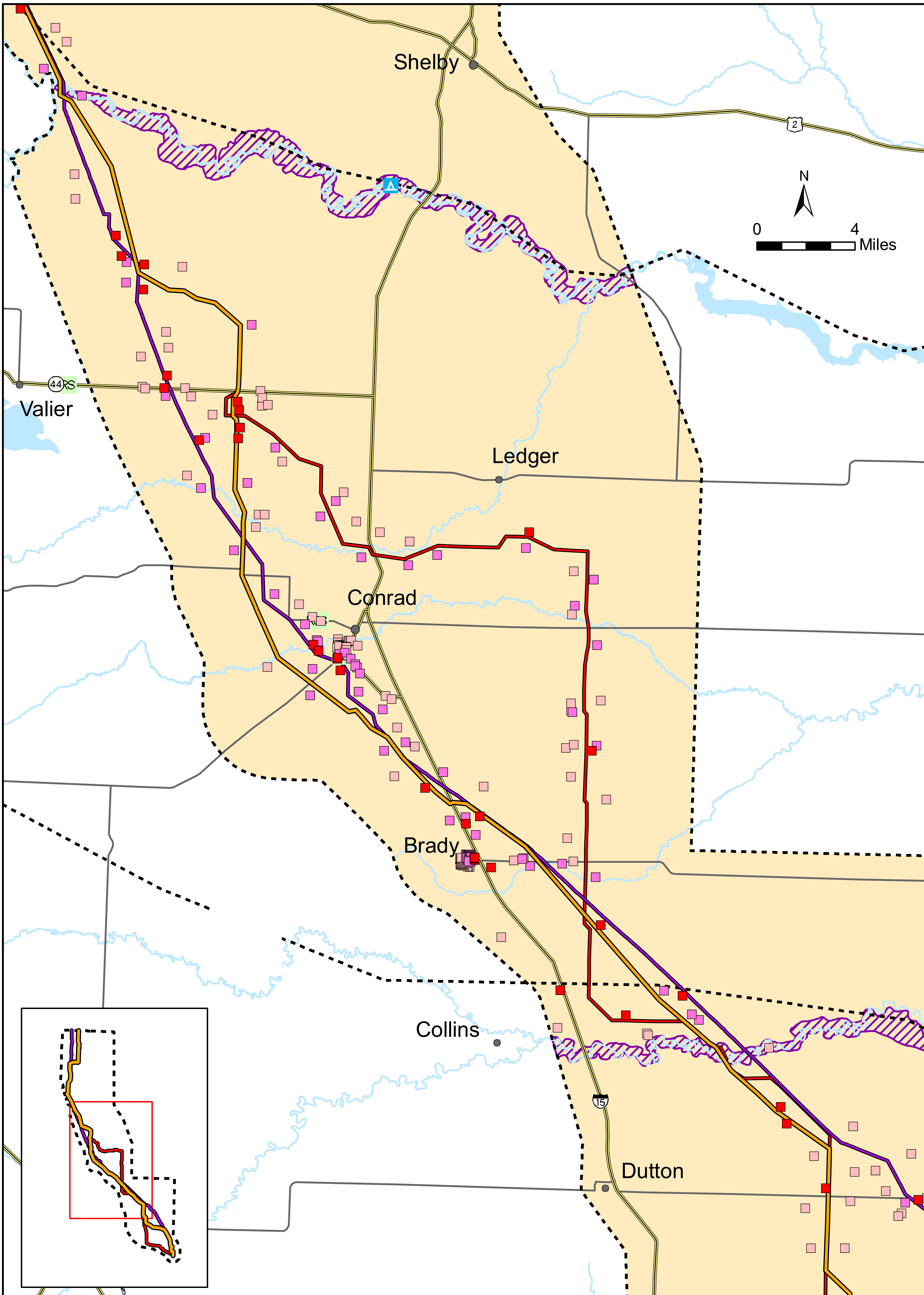


FIGURE 3.15-2
LOCATIONS OF VISUAL IMPORTANCE MIDDLE

LEGEND

- HOUSES WITHIN 1/4 MILE OF ANY ALTERNATIVE
- HOUSES BETWEEN 1/4 AND 1/2 MILE OF ANY ALTERNATIVE
- HOUSES BETWEEN 1/2 AND 1 MILE OF ANY ALTERNATIVE
- LEWIS AND CLARK CAMPSITES
- RS RECREATION SITES
- LEWIS AND CLARK TRAIL
- VISUAL SIMULATION POINTS WITH CAMERA ANGLE
- ALT2 - ALIGNMENT
- ALT3 - ALIGNMENT
- ALT4 - ALIGNMENT
- VISUAL QUALITY CLASS B AREAS
- BENTON LAKE NATIONAL WILDLIFE REFUGE
- LANDS MANAGED BY MT DEPT. FISH, WILDLIFE AND PARKS
- CITIES AND TOWNS
- ALIGNMENT END AND EXIT POINTS
- STUDY AREA
- MAJOR HIGHWAYS
- SECONDARY ROADS
- RIVERS AND STREAMS

NOTE:
ALT = ALTERNATIVE

GIS map by Ed Madej -TTEMI-HE Fig3_15-2_MATL_visual_impacts_middle_part_012007.mxd

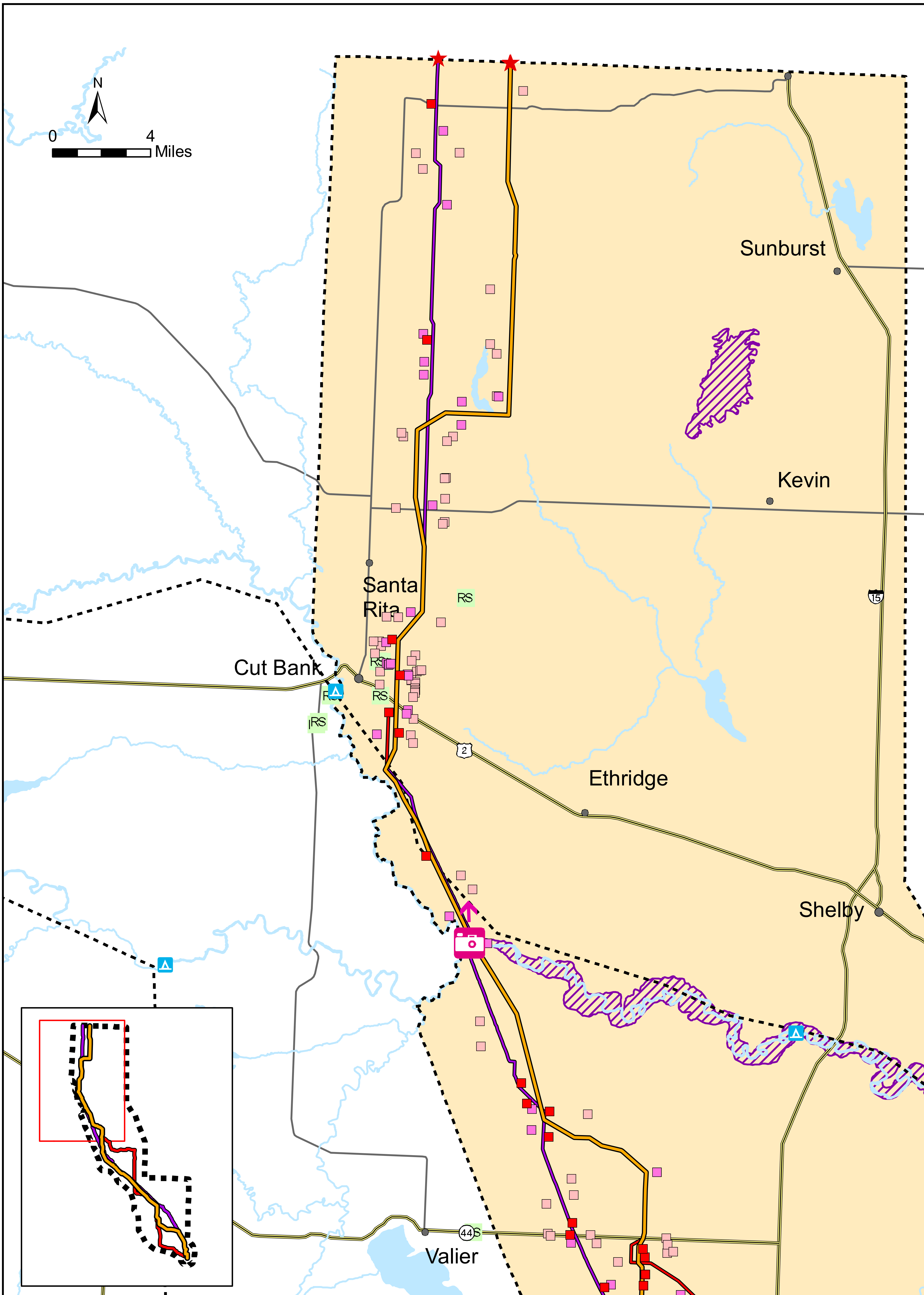


FIGURE 3.15-3
LOCATIONS OF VISUAL IMPORTANCE NORTH

LEGEND

- HOUSES WITHIN 1/4 MILE OF ANY ALTERNATIVE
- HOUSES BETWEEN 1/4 AND 1/2 MILE OF ANY ALTERNATIVE
- HOUSES BETWEEN 1/2 AND 1 MILE OF ANY ALTERNATIVE
- LEWIS AND CLARK CAMPSITES
- RS RECREATION SITES
- LEWIS AND CLARK TRAIL
- VISUAL SIMULATION POINTS WITH CAMERA ANGLE
- ALT2 - ALIGNMENT
- ALT3 - ALIGNMENT
- ALT4 - ALIGNMENT
- VISUAL QUALITY CLASS B AREAS
- BENTON LAKE NATIONAL WILDLIFE REFUGE
- LANDS MANAGED BY MT DEPT. FISH, WILDLIFE AND PARKS
- CITIES AND TOWNS
- ALIGNMENT END AND EXIT POINTS
- STUDY AREA
- MAJOR HIGHWAYS
- SECONDARY ROADS
- RIVERS AND STREAMS

NOTE:
ALT = ALTERNATIVE

GIS map by Ed Madej -TTEMI-HE Fig3_15-3_MATL_visual-impacts_north_part_012007.mxd

Uplands and benchlands

Uplands and benchlands comprise the majority of the Project study area. Benchlands are characterized by gently sloping terrain, expansive views, and irrigated cropland use. They occur predominantly in the center of the Project study area between the Marias River and Pondera Coulee. The remainder of the Project study area constitutes rolling uplands with a fairly uniform landscape of gently sloping wheat fields and grassland. These landscapes are designated Class C.

Existing Inventories

Federal and state land managers and local/county officials have not developed maps that establish an inventory of scenic attractiveness, distance zones or concern levels, scenic classes, and visual absorption capability for any portion of the Project study area.

Travel Routes

Travel routes include the primary and secondary roads shown in **Figures 3.15-1**, **3.15-2**, and **3.15-3**.

3.15.3 Environmental Impacts

Distance Zones and Visual Influence Zones

Distance zones were established based on thresholds for visual perception of form, texture, color, and line. These visual criteria change as distance from a viewpoint increases. Detailed elements on the landscape tend to become less obvious and detailed at longer viewing distances. Elements of form and line become more dominant than color and texture at longer viewing distances. Four distance zones were established:

- Immediate Foreground (0 to 0.25 mile) — The immediate foreground is the dominant view threshold. Details are easily perceived and obvious. Changes may dominate the landscape.
- Foreground (0.25 to 0.5 mile) — The foreground is the viewed area in which details are perceived and obvious, though less so than the immediate foreground.
- Middleground (0.5 to 1 mile) — The middleground is the zone where details of foliage and fine textures are less perceptible. Vegetation begins to appear as patterns. Form and line are more dominant visual elements.
- Background (1 to 3 miles) — The background is the portion of the landscape where texture is weak and landform becomes the most dominant element.

Impact Types and Levels

Most visual impacts are direct and long term. The major impact concern assessed by the visual resources study is the potential for a decline in aesthetic quality. Visual impact types evaluated include the following:

- Effects on scenic quality
- Effects on views from residential, commercial, institutional, and other visually sensitive land uses (existing and planned)
- Effects on views from travel routes
- Effects on views from established, designated or planned park or recreation areas
- Visual contrast resulting from different structure types and/or materials, and construction of new access trails

Determination of potential impacts and levels was based on assessing: 1) physical contrasts or landscape changes that would result from the project and 2) the degree of visibility that the project would have from each sensitive land use or scenic area (key observation points). Visibility levels for key observation points were determined by assessing viewer sensitivity, distance from the proposed project, and duration of views. The impact levels for areas with a current non urban area land use are described below. **Table 3.15-1** provides a summary of the impact levels for various observation points.

Major Impact – A high level of impact would result if the construction and operation of the transmission line would potentially cause substantial adverse change to viewers at residential and designated recreation sites or result in substantial and noticeable landscape alteration in areas of above average or outstanding visual quality. Generally, structures within the immediate foreground and foreground (½ mile) of residences, immediate foreground of recreation sites, or within areas of Class B scenic quality would result in a major impact. Structures within the immediate foreground or foreground of primary use travel corridors would result in a major impact.

Minor Impact – A minor level of impact would result if the construction and operation of the transmission line would potentially result in a noticeable landscape alteration in areas of average visual quality to viewers at residences, designated recreation sites (including the Lewis and Clark trail corridor), or along travel corridors. Generally, structures within the foreground (¼ to ½ miles) of recreation sites and within the middleground (½ to 1 mile) of residences would result in a minor impact. Structures within the middleground of primary use travel corridors would result in a minor impact.

Very Minor Impact – A very minor impact is the result of a small degree landscape alteration in areas of average or common visual quality. Views of the transmission line within the middleground and background of recreation sites, within the background of primary use travel corridors, within the background of residences, or within middleground and background of secondary use travel corridors would result in a very minor impact.

Residences, recreation sites, travel corridors, and areas with Class B scenic quality within 1 mile of Alternatives 2 through 4 are shown in **Figures 3.15-1** through **3.15-3**. The remainder of the natural landscape in the Project study area – including uplands, benchlands, rims, ridges, buttes, and wetlands – has generally lower landscape and viewer sensitivity.

TABLE 3.15-1
VISUAL IMPACT LEVELS FROM VARIOUS OBSERVATION POINTS[a]

Observation Points[a]	Immediate Foreground (0 – ¼ mile)	Foreground (¼– ½ mile)	Middleground (½ - 1 mile)	Background (> 1 mile)
Residential	Major	Major	Minor	Very Minor
Recreation	Major	Minor	Very Minor	Very Minor
Travel – Primary Roads	Major	Major	Minor	Very Minor
Travel – Secondary Roads	Minor	Minor	Very Minor	Very Minor

Notes:
[a] A transmission line going through a Class B scenic quality area would be a major impact.

3.15.3.1 Alternative 1 – No Action

There would be no additional visual impacts under the No Action alternative.

3.15.3.2 Alternatives 2, 3, and 4 – Action Alternatives

Information on the visual impacts from various observation points is provided in **Table 3.15-2**. The number of area residences, recreational sites, and class B scenic areas that fall within the immediate foreground, foreground, and middleground of each alternative centerline is provided in this table. In addition, the miles of major highways that fall within the immediate foreground, foreground, and middleground of each alternative centerline are provided. **Figures 3.15-1, 3.15-2**, and **3.15-3** provide a visual overview of the data provided in **Table 3.15-2**.

TABLE 3.15-2
COMPARISON OF DISTANCE ZONES FROM VARIOUS OBSERVATION POINTS[a]
Action Alternatives 2, 3, and 4

Alternative	**Number of Residences (Points)**			**Recreation – General[b] (Point)**			**Recreation - L & C Trail (Lineal Mileage)**			**Travel Corridor[c] (Lineal Mileage)**		
Miles	0 to 1/4	1/4 to 1/2	1/2 to 1	0 to 1/4	1/4 to ½	1/2 to 1	0 to 1/4	1/4 to 1/2	1/2 to 1	0 to 1/4	1/4 to 1/2	1/2 to 1
Alternative 2	30	60	91	1	2	NA[d]	7.94	3.39	NA	3.3	2.8	6.3
Alternative 3	34	71	124	0	3	NA	7.72	2.3	NA	3.7	3.9	8.2
Alternative 4	20	45	111	0	0	NA	6.51	2.85	NA	2.7	2.3	5.3

Notes:
[a] All action alternatives would cross the Marias River and Teton River, which are Class B scenic areas.
[b] Does not include the conservation easement located north of the Missouri River at Great Falls switch yard (Lewis and Clark Greenway Conservation Easement).
[c] Interstate 15 and U.S. Highways 2 and 87
[d] NA = Not available

Residential Areas – Long Term

Residences are located within the immediate foreground and foreground of the centerline of each action alternative. As **Table 3.15-2** indicates, Alternative 4 would have the least number of residences (65) within ½ mile. Alternative 2 would have the second least (90). Alternative 3 would have the highest number of residences within ½ miles (105). As a result, the overall long-term impact for residences that would be classified as a major impact would be the highest for Alternative 3 and the lowest for Alternative 4. The long-term impact for residences that would be classified as minor (within ½ to 1 mile of an alternative centerline) would be highest for Alternative 3 (124 residences) and lowest for Alternative 2 (91 residences). No residential clusters, including Hutterite colonies, are located within the immediate foreground or foreground of any of the alternatives. One Hutterite colony is located within one mile of Alternative 2.

Recreation Areas – Long Term

All three action alternatives would cross the Lewis and Clark National Historic Trail and the Teton and Marias river corridors. All action alternatives would also be within the foreground of the Missouri River Corridor and several developed recreation areas near Great Falls including Giant Springs State Park, the Lewis and Clark Interpretive Center, and the Lewis and Clark Heritage Greenway. Alternative 2 crosses to the south and west of the Great Falls Shooting Sports Complex located north of Great Falls; Alternative 3 crosses to the west of the complex. Both Alternatives 2 and 3 cross within the foreground of Benton Lake National Wildlife Refuge. Other recreation areas considered, but not within the foreground, include wildlife production areas, research natural areas, and other sporting venues/complexes (for example, golf courses, race tracks, rodeo arenas, city parks) located along alignment alternatives near Cut Bank, Conrad, and Great Falls. Although many recreational areas in the Great Falls area would be within the foreground of the proposed transmission line, the proposed transmission line would be an additional line in a setting with many transmission lines and a substation. The visual effect of an additional line would be incremental.

As shown in **Table 3.15-2**, Alternative 4 would not have any recreational sites within ½ mile of the alignment. Alternatives 2 and 3 would each have three recreation sites within ½ mile; however, one site (Morony entrance to the Great Falls Shooting Sports Complex) would be less than ¼ mile from Alternative 2 only. A recreational site within ¼ mile is classified as a major impact.

Travel Routes – Long Term

Major travel routes that were considered include: Interstate 15 and U.S. Highways 2 and 87. Each of these highways would be crossed by each action alternative. The action alternatives differ slightly in the lineal miles of proposed alignment that would be within ½ mile of these major travel routes. Alternative 2 would have 11.3 miles within ½ mile, Alternative 3 would also have 11.3 miles within ½ mile, and Alternative 4 would have 9.4 miles (**Table 3.15-2)**. A transmission line within ½ mile of a major travel route is classified as a major impact.

Two computer generated visual simulations were developed showing the proposed line looking northwest from Montana State Highway 44, also known as Bootlegger Trail (see location map **Figure 3.15-4**). Though not a high volume road (major travel route), this viewpoint on Bootlegger Trail is typical of views from secondary roads. One view incorporates an H-frame power line (**Figure 3.15-5**), and one view incorporates a monopole power line with a typical structure height of 68 to 86 feet and a ruling span of 475 feet (**Figure 3.15-6**). MATL is also considering use of monopole structures that would have a typical height of 85 to 99 feet and a ruling span of 790 feet. While the span length of the taller monopoles would more closely approximate that of H-frame structures, their increased height would make them more visible.

Visual impacts on all major travel routes would be comparable for all action alternatives with major impact levels for the immediate foreground and foreground viewing areas. The MATL 230-kV transmission line would cross secondary roads seven times under Alternative 2, seven times under Alternative 3, and six times under Alternative 4. Visual impacts on all secondary road crossings would be minor.

Landscape Alteration – Long Term

The visual contrast of the proposed transmission line would be based on varying levels of potential landform and vegetation alteration that would result from construction. Landform contrast would result where access roads and pads for structure erection are constructed in hilly or steep terrain. Hillside benching, exposure of subsoil, and erosion scars from project construction in steeper terrain could modify existing topography and soils, resulting in visual contrast that is long term. These effects are more likely to occur on steeper slopes near the crossings of the Marias and Teton rivers, compared to surrounding uplands and plains. However, the transmission line structures would be located so that no roads need to be constructed over the edge of cliffs along the Marias and Teton rivers. **Figure 3.15-7** shows a computer generated visual analyses of an H-frame power line crossing the Marias River. Based on the crossing of rivers corridors with Class B scenic quality, the potential impact for all action alternatives would be major.

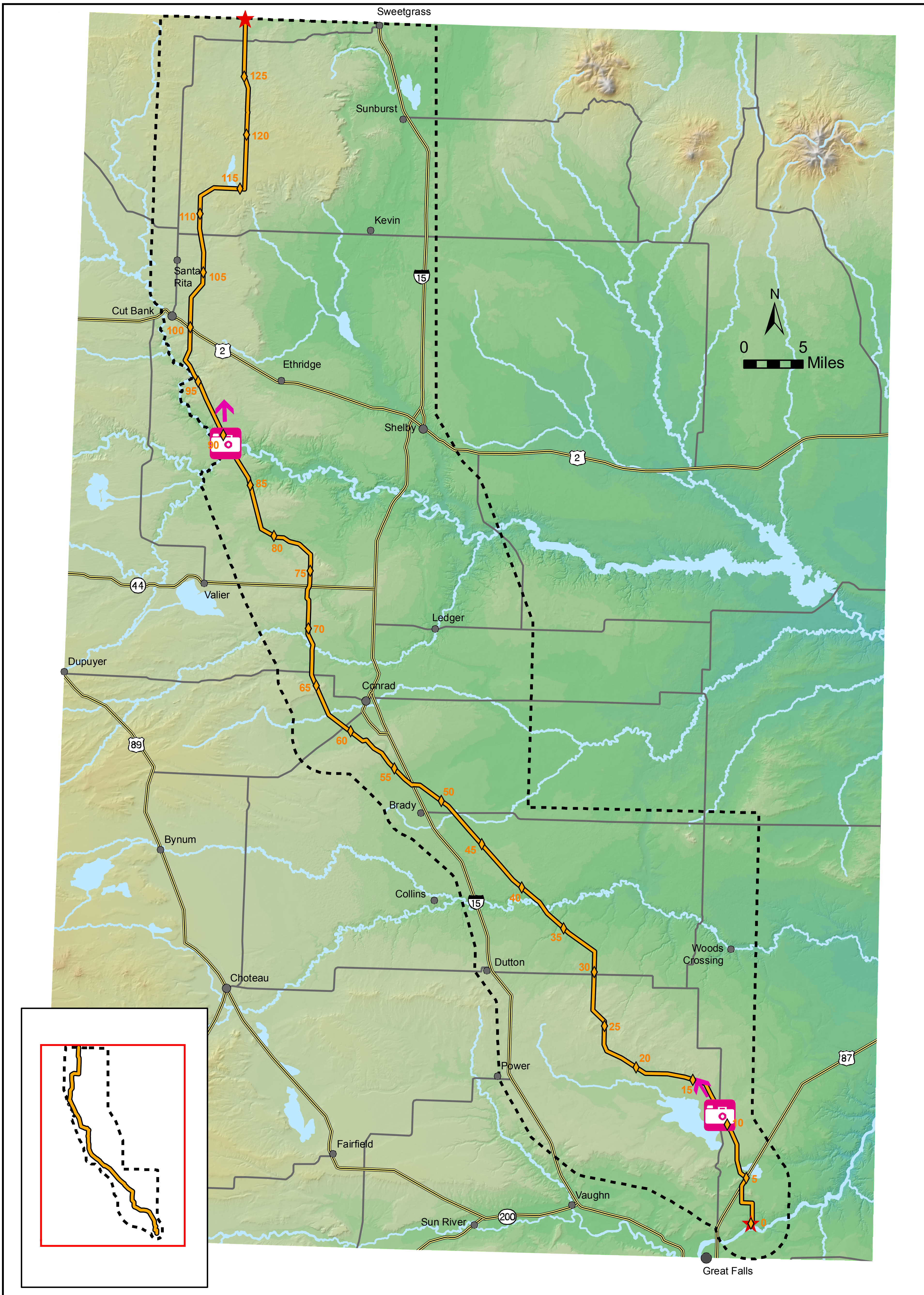


FIGURE 3.15-4
VISUAL SIMULATION LOCATIONS

LEGEND

- ALTERNATIVE 2 - ALIGNMENT
- MILEPOSTS
- VISUAL SIMULATION POINTS WITH CAMERA ANGLE
- CITIES AND TOWNS
- ALIGNMENT END AND EXIT POINTS
- STUDY AREA BOUNDARY
- MAJOR HIGHWAYS
- SECONDARY ROADS
- RIVERS AND STREAMS

NOTE:
ALT = ALTERNATIVE

GIS map by Ed Madej -TTEMI-HE Fig3_15-4_MATL_Visual_Simulation_Locations_012007.mxd

FIGURE 3.15-5
PROPOSED MATL POWERLINE
BOOTLEGGER TRAIL
VISUAL SIMULATION
(Lat/Long: 47.679944, -111.283055 - 05/31/06 10:00 a.m.)

FIGURE 3.15-6
PROPOSED MATL POWERLINE
BOOTLEGGER TRAIL - Agency Alt.
VISUAL SIMULATION
(Lat/Long: 47.679944, -111.283055 - 05/31/06 10:00 a.m.)

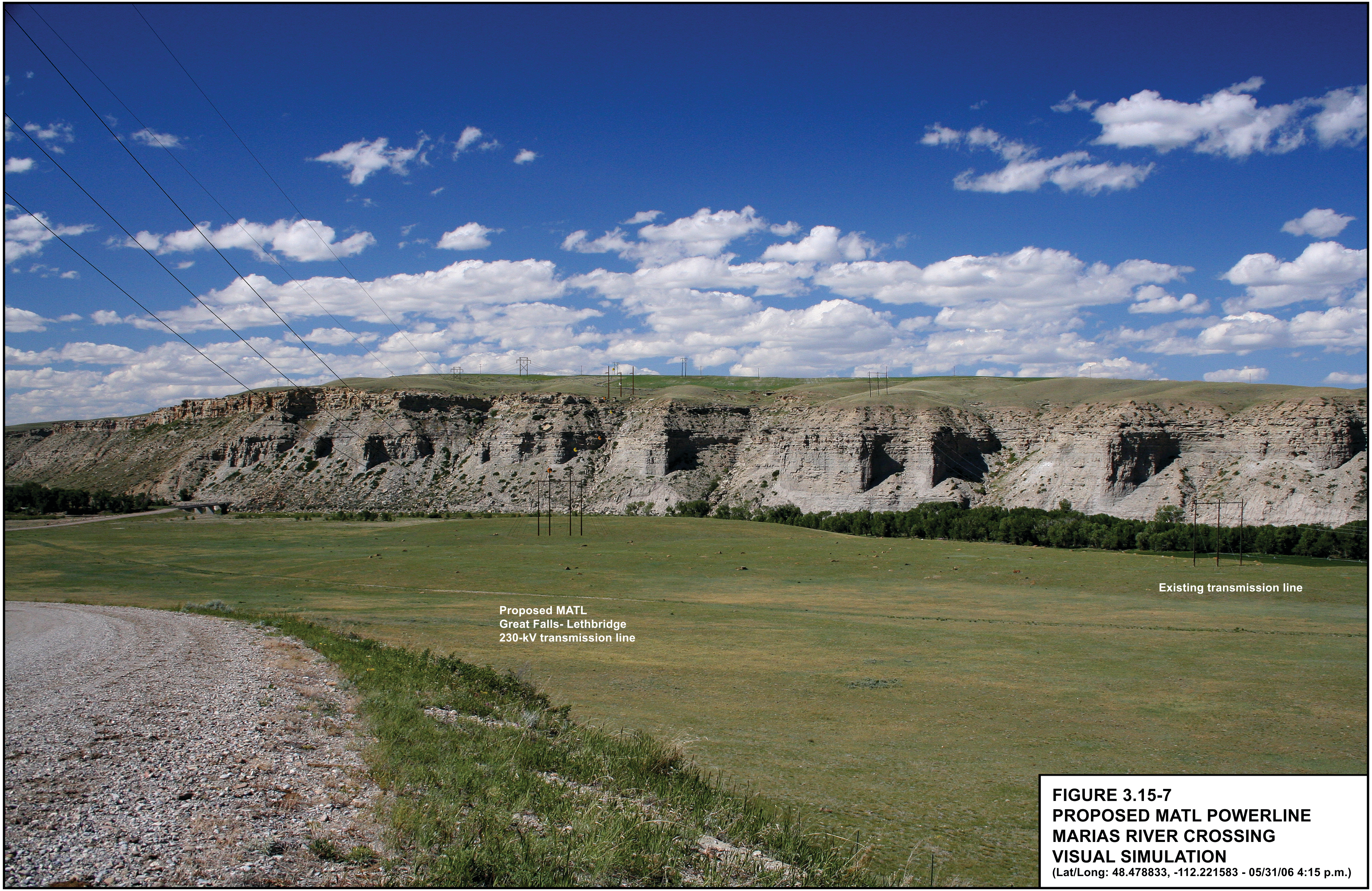


FIGURE 3.15-7
PROPOSED MATL POWERLINE
MARIAS RIVER CROSSING
VISUAL SIMULATION
(Lat/Long: 48.478833, -112.221583 - 05/31/06 4:15 p.m.)

Successful implementation of reclamation and revegetation efforts and the avoidance of dense riparian vegetation at the proposed river crossing would decrease the impact to minor levels.

Vegetation contrast is a function of existing cover type (riparian forest, grassland, or agricultural cropland) and the amount of clearing needed for line construction and maintenance. Higher levels of vegetation contrast would result where woody riparian growth is removed from the right of way, structure sites, and access roads. This effect can be long term where mature trees, windbreaks, and other woody vegetation are trimmed or removed for line operation over the life of the project.

Visual Impacts — Short Term

In agricultural cropland, vegetation would be removed for one growing season as structures are erected and construction traffic uses access roads. This effect would likely be short term for all action alternatives as crops would be restored in the following year.

Visual Resource Mitigations

To minimize adverse environmental impacts to visual resources from Alternative 2 and address local visuals issues in specific places, DEQ identified several potential mitigation realignments that are described by segments A1, A2, B1, B2, C1, C2, D, and E in **Appendix A.** The realignments that would mitigate visual impacts on a local scale are:

- Segment D - Belgian Hill Realignment
- Segment E - South of Cut Bank Realignment

A description of these realignment segments and the agency's preliminary analysis of their environmental impacts are presented in **Appendix A**.

3.16 Electrical Transmission System Operation and Reliability

This section describes the affected transmission system as it is currently configured and managed, and how reliability could be affected by the Project. This analysis was based, in part, on the results of a system feasibility study (ABB Consulting 2005) and the NorthWestern Energy MATL System Impact Study (Appendix I to the MATL application). Additional data and information for this section were compiled and refined from several sources including the MATL application for certification (MATL 2006b) and information contributed by DEQ economist (Blend 2007).

Prior to issuing a Presidential permit, DOE will prepare a separate reliability determination. At the time this document is published, information on which to base the DOE decision is preliminary.

3.16.1 Existing Transmission System

The North American transmission grid moves electricity from power-generating facilities to customers using a transmission system coordinated by the North American Electric Reliability Council (**Figure 1.1-2**). NERC's mission is to ensure that the bulk electric system in North America is reliable, adequate, and secure. NERC's primary role is to set standards for the reliable operation of the bulk electric system and monitor and enforce compliance with reliability standards (NERC 2007). NERC is composed of eight regional reliability councils formed in response to national concern regarding the reliability of the interconnected bulk power systems, the ability to operate these systems without widespread failures in electric service, and the need to foster the preservation of reliability through a formal organization (NERC 2007).

Montana is located primarily within the western grid under the authority of the Western Electricity Coordinating Council (WECC). The WECC region is the largest and most diverse of the regional councils. WECC's service territory extends from Canada to Mexico and includes the provinces of Alberta and British Columbia, the northern portion of Baja California, Mexico, and all or portions of the 14 western states in between (**Figure 1.1-2**). The WECC mission is to support efficient competitive power markets, assure open and non-discriminatory transmission access among members, and provide a forum for resolving transmission access disputes (WECC 2007). There is currently no direct power transmission connection between Alberta and Montana (**Figure 1.1-2**).

Transmission Capacity

Owners of transmission lines sell rights to use lines on a long-term firm basis, a long-term non-firm basis, or a short-term basis. "Firm" transmission service is a contractually established priority right to transmit a given amount of energy for a given period of time. "Non-firm" service is typically reserved and scheduled on an as-available basis and is subject to curtailment or interruption. An agreement must be in place between a shipper and an owner of a line before any power can be transmitted over the western grid. Under WECC requirements, the owner of a line must determine whether the line has available capacity before an agreement can be entered into. The available transmission capacity is calculated by subtracting contracted uses from the total rated line flow capacity. The transmission path can be described as congested if (1) no rights to use it are for sale, (2) it is fully scheduled and no firm space is available, or (3) the path is fully loaded to its flow capacity (DEQ 2004).

Electricity moving across the western grid does not necessarily follow contracted paths. Rather it flows along the paths of least resistance. Therefore, before a new transmission line is added to a grid, operators of the grid conduct studies to ensure that new power does not overload other lines and substations on the grid. In the case of the proposed MATL line, these studies are overseen by WECC.

Montana's Electricity Generation and Transmission System

Except for several rural electric cooperatives and Montana Dakota Utilities customers, Montana's residential and commercial customers receive most of their contracted electricity from generation facilities located in Montana (DEQ 2004).

Most of Montana's electric generation is owned by private utilities or by the federal government through the U.S. Army Corps of Engineers or the Bureau of Reclamation. The Bonneville Power Administration (BPA) and WAPA market hydropower from federal dams in Montana. PPL Montana is the largest supplier of Montana-consumed energy, owning both hydroelectric and coal-fired generation. PPL Montana's hydroelectric generation facilities are regulated by the Federal Energy Regulatory Commission (FERC).

Montana has just over 5,000 MW of electrical generation capacity within its borders, most of it coal-fired and hydroelectric power. From 1999 to 2003, Montana's electric generating plants produced an average output of about 3,000 average megawatts (aMW) (DEQ 2004). During that same time period, just over half of Montana generation was consumed in-state, while approximately 1,400 aMW were delivered out of the state (DEQ 2004).

Wholesale prices of electricity are set by contract negotiations between transmission suppliers and electricity suppliers. Wholesale prices in Montana are usually bounded by prices at the Mid-Columbia hub located near the Columbia River in Washington State. Usually, the wholesale price for electricity goes no higher than the Mid-Columbia price minus transmission costs into Montana (Blend 2007). NWE is the only major Montana transmission utility in-state on the Western Grid and is responsible for determining the default power supply for consumers in Montana. The default source must be approved by the Public Service Commission (Blend 2007).

NWE, Montana's largest private transmission and distribution utility, uses around 600 to 650 aMW of electricity to serve its customers, with a peak usage of over 1,000 MW. BPA and WAPA provide transmission service to electric cooperatives that deliver electricity to many of the smaller Montana customers on the western grid not served by NWE. Other wholesale suppliers provide electricity over transmission lines owned by NWE to a number of large commercial and industrial customers. NWE is regulated by the Montana Public Service Commission, FERC, and WECC rules, while BPA and WAPA and electric cooperatives must meet federal regulatory and WECC requirements.

Alberta's Electricity Generation and Transmission System

Alberta has experienced the fastest growing electricity demand in Canada over the past 5 years (Independent Power Producers Society of Alberta 2006). Since 1999, the demand for power in Alberta has grown by 21 percent, which compares to the average growth of demand in North America of 12 percent over the same time period (Independent Power Producers Society of Alberta 2006). To meet this demand, approximately 3,800 MW of new generation have been added to Alberta's grid in the past 7 years (Independent Power Producers Society of Alberta 2006). This includes new coal units (450 MW), new wind and alternative fuel projects (300 MW), and 3,000 MW of new gas-fired generation. At present, Alberta has 11,557 MW of supply capacity, compared with almost 9,600 MW of peak demand (Alberta Department of Energy 2006). An additional 4,800 MW of power generation has been announced by industry for future development in Alberta (Alberta Department of Energy 2006).

Coal-fired generation makes up just over 50 percent of Alberta's generating capacity and gas almost 40 percent, with hydro, wind, and alternative fuel making up the remaining 10 percent (Alberta Department of Energy 2006).

The electric transmission system in Alberta is owned, built, and maintained by private investors (Alberta Department of Energy 2006), except for some municipally owned utilities. Alberta has nearly 30 suppliers offering new electricity products and services to Alberta's wholesale, commercial, and residential customers. Alberta also has electric cooperatives. Wholesale prices are set by the laws of supply and demand in Alberta and fluctuate daily in response to consumer demand (Alberta Government Services

2006). Alberta's hourly wholesale electricity market is managed by the Alberta Electric System Operator (AESO), an independent system operator that facilitates Alberta's competitive wholesale electricity market and is accountable for the administration and regulation of load settlement function (AESO 2007). Consumers may choose their own electricity supplier or remain under default supply arrangements determined by AESO, which are periodically adjusted to reflect actual wholesale power costs (Alberta Government Services 2006). The costs and expansion plans of Alberta's transmission and distribution lines are regulated by the Alberta Energy and Utilities Board.

Alberta has been a net importer of electricity 5 out of the last 6 years, but electricity regularly flows in and out of the province (Alberta Department of Energy 2006). Alberta is not currently directly connected to Montana but has 800 MW of transmission connections with British Columbia and 150 MW with Saskatchewan (**Figure 1.1-2**).

3.16.2 System Reliability Constraints and Influences

Power transmission systems must include many sources of generation and pathways to be reliable sources of electricity. The MATL transmission line may improve reliability on Montana's transmission system due to (1) better generation resource sharing and (2) different electric routing options. Different transmission system operators (jurisdictions) have different load factors and different mixes of generation. One example of this is peak loads occurring at different times of the day or seasons of the year for different jurisdictions. The fact that every jurisdiction does not experience peak demand and supply at exactly the same time of day/month allows the potential sharing of resources, which could lead to improved reliability (Williams 2006). Tie lines such as MATL can respond to these different load and generation characteristics.

A stand alone jurisdiction would need more generators standing by on an as-needed basis to cover planned and unplanned outages of generating units, than would be required for the same level of reliability if that jurisdiction was interconnected to other jurisdictions. The probability that multiple adjacent jurisdictions would experience a large loss of generation at the same time is very low, so adjacent jurisdictions can get the benefits of higher generation reliability by sharing generation resources. Sharing these resources costs each jurisdiction less than what it would cost to own the resource entirely and not share (Williams 2006).

Potential Impacts to System Reliability

Potential impacts to system reliability from the Project and alternatives are under evaluation by the NERC and will be disclosed in a report in early 2007. If NERC determines that the proposed MATL line would adversely impact system reliability outside the tolerance levels of NWE and the WECC performance criteria, the Project would not go forward. Similarly, if the costs to mitigate system reliability concerns are too high, the Project would not go forward. Preliminary findings regarding system reliability are provided below.

Potential Impacts to Reliability Based on Information Provided by MATL

The MATL tie line would potentially serve three jurisdictions: NWE, WAPA, and AESO. MATL would potentially enable the sharing of generation resources located in these jurisdictions, thereby providing a level of reliability that no one jurisdiction could afford if that jurisdiction had to cover the full cost of all of the same generators entirely on its own.

MATL might also allow more alternative options for power routing within Montana. If a particular line was removed from service due to either an unexpected event or scheduled maintenance, the MATL tie line could be used to supply power from the north giving transmission operators in Montana one more option to use in case of a removed line. This routing would depend upon loading on the line. Alberta's independent system operators might be able to use MATL in a similar fashion for their service area.

Several studies specific to the MATL project have been prepared to address impacts to transmission system reliability. No general conclusions can be made at this time regarding the Montana stability performance or performance on the rest of the western grid based on this single case study (ABB Consulting 2005). Results of the WECC study should answer these questions.

Potential Impacts to Reliability Based on Information Provided by NWE

A system impact study by NorthWestern Energy (NWE 2005) provides the following conclusions:

- No stability problems were found associated with just connecting the MATL 230-kV line to the Great Falls 230-kV switch yard.
- The addition of the MATL project to all appropriate generation interconnection projects with prior claims to NWE's system capacity under normal conditions did not cause any problems to the transmission system.
- Certain mitigation measures would be necessary to move power out of the Great Falls switch yard under conditions in which the largest line in a transmission path is out of commission or under higher outage conditions. The interconnection of the MATL line and the other generation interconnection projects to NWE's transmission system could result in curtailment of all, or a portion, of the energy flow at the switch yard during outages on the transmission system. NWE's transmission system would need improvements prior to delivering the full output at all times of this project in conjunction with the full output of other senior projects.

- Power delivered can do useful work only when current and voltage are perfectly in phase with each other. Flows greater than 150 MW on the line would require voltage additions at Cut Bank to compensate for line losses, such as those due to heat. There were no other overloads on the existing Montana system in the cases studied. As new generation at Judith Gap and Great Falls were added in the simulation, overloads began to occur on the Montana system for transmission outages in the Great Falls area. Any new generation, such as additional wind farms that would supply electricity to the MATL line, would make conditions worse. The overload conditions could be mitigated by reducing MATL flows when an outage occurs. New transmission additions in Montana would be required as MATL and new generation were added (ABB Consulting 2005).
- The results from simulation studies completed to date specific to the MATL project suggest that electric transmission system improvements would be required to provide a reliable connection of the MATL tie line under normal system conditions. In addition, the system could need mitigation measures for outage conditions in which other large lines would be out of commission. This mitigation would be identified in the WECC Three Phase Rating study. It is unclear who would pay for those mitigation measures. To the extent that Montana consumers do, that would be a cost to Montanans of the MATL line.

3.17 Draft Findings for Certification Approval

DEQ will approve a transmission line facility as proposed or as modified or an alternative to the proposed facility if it finds and determines:

- the need for the facility;
- the nature of probable environmental impacts;
- that the facility minimizes adverse environmental impact, considering the state of available technology and the nature and economics of the various alternatives;
- what part, if any, would be located underground;
- that the location of the proposed facility conforms to applicable state and local laws;
- that the facility will serve the public interest, convenience, and necessity;
- that DEQ has issued all necessary decisions, opinions, orders, certifications, and permits; and
- that the use of public lands for location of the facility was evaluated, and public lands were selected whenever their use is as economically practicable as the use of private lands (75-20-301[1], MCA).

The information supporting these determinations is summarized in this section.

3.17.1 Need

The Project is needed to provide transmission capacity between Lethbridge and Great Falls. Additional capacity would allow increased electricity trading between Alberta and Montana and could facilitate development of wind farms in the northern part of the study area.

3.17.2 Nature of Probable Environmental Impacts

Probable impacts to land use, geology, soils, safety, hazardous material management, electric and magnetic fields, water, wetlands, vegetation, wildlife, fish, special status species, air quality, noise, socio-economics, paleontological resources, cultural resources, transportation, utilities, visual resources, and the existing transmission system from the proposed Project and alternatives are described in Sections 3.1 through 3.15 and summarized in **Table 3.17-1**. This table summarizes impacts from Alternative 2 as proposed by the applicant. It does not include mitigation measures (such as potential alignment changes described for the land use and visuals mitigation discussions in Chapter 3 that may or may not be applied to Alternative 2 if selected as the preferred alternative. No natural resource would experience a substantial impact from implementation of any action alternative.

TABLE 3.17-1
SUMMARY COMPARISON OF ENVIRONMENTAL IMPACTS AND COSTS BY ACTION ALTERNATIVE

Resource Area/ Resource Attribute	Alternative 2	Alternative 3	Alternative 4	Summary of Impacts
Land Use – General Impacts	Potential impacts compared to other alternatives depend on length of alignment in general, and length on cropland.	Potential impacts compared to other alternatives depend on length of alignment in general, and length on cropland.	Potential impact compared to other alternatives depend on length of alignment in general, and length on cropland.	Loss of production due to structures & roads, increased risk of weed introduction and spread, risk of equipment damage from hitting a structure, increased time to farm around poles, and some GPS-guided equipment may be affected. Cropland crossings also increase the risk of crop duster accidents.
Land Use – General Impacts	Similar for all alternatives	Similar for all alternatives	Similar for all alternatives	During construction, facility construction traffic may conflict with movement of farm equipment on roads.
Land Use- Total Amount of Land Crossed	129.9 miles	121.6 miles	139.6 miles	Alt 3 would disturb the least amount of land. Alt 4 would disturb the most.
Land Use – Total Cropland crossed	92.7 miles	97.7 miles	87.9 miles	Alt 4 crosses the least cropland. Alt 3 crosses the most cropland.
Land Use – Total Cropland Crossed Diagonally	52.9 miles	70.4 miles	27.1 miles	Alt 4 crosses the least cropland diagonally / Alt 3 crosses the most diagonally.
Land Use – Guaranteed Use of Monopoles On Cropland	No	No	Yes	Alt 4 requires the use of monopoles for crossing all cropland, Alts 2 and 3 would use monopoles at the discretion of MATL.
Land Use –Special Management Areas Crossed	11.2 miles	6.4 miles	11.2 miles	Alt 3 would cross the least amount of special management areas. Alt 4 would avoid the Great Falls Shooting Sports Complex
Land Use – Conservation Easements Crossed	23.6 miles	18.1 miles	32.5 miles	Alt 3 would cross the least amount of conservation easements. Alt 4 would cross the most.
Land Use – Proximity to Residences	1 residential development within 100 feet of alignment	4 residential developments within 100 feet.	1 residential development within 100 feet of alignment.	Alts 2 and 4 have the fewest residential developments close to the alignment.

TABLE 3.17-1 (Continued)
SUMMARY COMPARISON OF ENVIRONMENTAL IMPACTS BY ACTION ALTERNATIVE

Resource Area/ Resource Attribute	Alternative 2	Alternative 3	Alternative 4	Summary of Impacts
Land Use – Length of 500-foot-wide Alignment Buffer Zone Within 100 feet of a Pipeline.	7.0 miles	23.7 miles	5.7 miles	Alt 4 has the least amount of the 500-foot alignment buffer zone near pipelines. Alt 3 contains the greatest length of alignment near pipelines.
Land Use – Impacts to Roads and Road Use	Increased traffic on roads during construction resulting in occasional conflicts with farm machinery.	Same as Alt 2	Same as Alt 2	All alternatives have similar impact
Geology – Miles on Soil and Geologic Resources Prone to Mass Movement	9 miles	3 miles	20 miles	Alt 3 would have the least risk of causing mass movement that could result in pole instability. Alt 4 presents the greatest risk.
Soils – Miles on Unstable Soils	10 miles	12 miles	24 miles	Alt 2 would have the least risk of soil erosion. Alt 4 presents the greatest risk. Soil erosion impacts can be mitigated under all alternatives.
Engineering	No adverse impact to structural reliability is anticipated.	Same as Alt 2	Same as Alt 2	All facilities are proposed to be constructed in compliance with accepted engineering standards.
Hazardous Materials	No impact to resources from hazardous materials is anticipated.	Same as Alt 2	Same as Alt 2	MATL proposes to manage and transport hazardous materials and wastes in accordance with State and federal requirements.
EMF – Exposure Levels	No impact	Same as Alt 2	Same as Alt 2	Exposure levels would not exceed state standards for electric fields.
EMF – Radio or TV Interference	No impact	Same as Alt 2	Same as Alt 2	No alternative is expected to interfere with radio or TV reception.

TABLE 3.17-1 (Continued)
SUMMARY COMPARISON OF ENVIRONMENTAL IMPACTS BY ACTION ALTERNATIVE

Resource Area/ Resource Attribute	Alternative 2	Alternative 3	Alternative 4	Summary of Impacts
Water – General Impacts	Potential impact compared to other alternatives depends on number of river crossings	Potential impact compared to other alternatives depends on number of river crossings	Potential impact compared to other alternatives depends on number of river crossings	Minor short-term adverse impacts to surface water quality could occur by temporarily increasing sources of sediment from the time of construction to reclamation completion. This impact would be mitigated if water and riparian areas are undisturbed or measures to reduce sediment transport are installed.
Water – Potential Number of Perennial Stream or River Crossings	10	6	17	Alt 3 poses the lowest risk and Alt 4 poses the highest risk of contributing sediment to streams based on number of stream crossings.
Water – Potential Number of Lake Crossings	4	6	2	
Wetlands - General	Potential impact compared to other alternatives depends on acres of crossed wetlands	Potential impact compared to other alternatives depends on acres of crossed wetlands	Potential impact compared to other alternatives depends on acres of crossed wetlands	Construction disturbance could result in a change in wetland plant community if wetland hydrology is altered. This impact would not occur if wetlands were undisturbed during construction and maintenance.
Wetlands – Total Wetlands and Potential Wetlands Crossed	67.6 acres	62.3 acres	76.4 acres	Alt 3 crosses the least amount of ground that contains wetlands and potential wetlands. Alt 4 crosses the greatest amount of wetlands and potential wetlands.
Vegetation - General	Potential impact compared to other alternatives is dependent on acres of disturbed native vegetation	Potential impact compared to other alternatives is dependent on acres of disturbed native vegetation	Potential impact compared to other alternatives is dependent on acres of disturbed native vegetation	Temporary loss of vegetation and increased risk of weed emergence and dispersion in disturbed areas until reclaimed.
Vegetation – Potential loss during construction	38 acres	41 acres	48 acres	Alt 2 would disturb the least amount of native vegetation; Alt 4 would disturb the largest acreage.

TABLE 3.17-1 (Continued)
SUMMARY COMPARISON OF ENVIRONMENTAL IMPACTS BY ACTION ALTERNATIVE

Resource Area/ Resource Attribute	Alternative 2	Alternative 3	Alternative 4	Summary of Impacts
Wildlife - General	Impacts greatest for birds and animals with low mobility.	Same as Alt 2	Same as Alt 2	Short-term impacts include loss of individuals during construction or direct disturbance of species during critical periods in their life-cycles. Long-term impacts include habitat alterations, electrocutions, and collisions. Impacts would be similar for all alternatives.
Wildlife- Crosses Mule Deer Habitat	19 miles	10 miles	28 miles	Minor to no impact to mule deer population relative to the size of the existing habitat and individual mobility.
Wildlife – Birds	Collisions with transmission line could result in bird loss. Portion of the line located near wetland and the Benton Lake National Wildlife Refuge would experience bird collisions.	Because the line length and location are similar to the existing 115-kV line in Alt 1 (within 1% difference) and both pass near wetlands and the Benton Lake National Wildlife Refuge, impacts to wildlife would be similar to Alt 2.	Same as Alt 3	Bird collision potential is similar for all alternatives.
Fish – Expected Impacts to Water Quality	10 perennial river crossings	6 perennial river crossings	17 perennial river crossings	Alt 3 poses the lowest risk of affecting fish habitat by contributing sediment to streams based on the number of stream crossings.
Special Status Species - Vegetation	All known occurrences are located outside the study area	Same as Alt 2	Same as Alt 2	Risk to vegetation special status species is based on risk to its habitat (wetlands). Alt 3 has the least likelihood of affecting vegetation species of concern because the alignment crosses less riparian habitat than Alts 2 and 4.
Special Status Species – Wildlife Habitat	19.9 miles	11.3 miles	11.7 miles	Alts 3 and 4 would cross the least amount of habitat type used by special status species wildlife.

TABLE 3.17-1 (Continued) SUMMARY COMPARISON OF ENVIRONMENTAL IMPACTS BY ACTION ALTERNATIVE				
Resource Area/ Resource Attribute	**Alternative 2**	**Alternative 3**	**Alternative 4**	**Summary of Impacts**
Air Quality - General	Some localized short-term emissions of particulate matter would occur during construction.	Same as Alt 2	Same as Alt 2	All alternatives have similar impact
Audible Noise - General	Short-term, localized construction noise. Noise from rain or wind on the transmission line would be below BPA and HUD guidelines.	Same as Alt 2	Same as Alt 2	All alternatives have similar impact
Social Resources	Increased short-term construction and long-term maintenance employment opportunities	Same as Alt 2	Same as Alt 2	All alternatives have similar impact
Economics – Short Term	Short-term construction-related employment would be available.	Same as Alt 2	Same as Alt 2	All alternatives have similar impact
Economics - Counties	Long-term operation and maintenance employment would be available. County and State tax revenues would increase.	Same as Alt 2	Same as Alt 2	All alternatives have similar impact
Economics - State	Opportunities to export electric power would increase. Increased competition may reduce cost to ratepayers. Creation of opportunities to start up wind generation facilities.	Same as Alt 2	Same as Alt 2	All alternatives have similar impact

TABLE 3.17-1 (Continued)
SUMMARY COMPARISON OF ENVIRONMENTAL IMPACTS BY ACTION ALTERNATIVE

Resource Area/ Resource Attribute	Alternative 2	Alternative 3	Alternative 4	Summary of Impacts
Paleontological Resources – Miles of Geologic Units Crossed With a High Probability of Containing Fossils.	51.6 miles	44.3 miles	44.6 miles	Alt 3 would cross the fewest miles having a surface expression of the Two Medicine Formation which has a high probability of containing fossils. Alternative 2 would cross the most miles over the Two Medicine Formation.
Cultural Resources- Number of Cultural Resources Crossed	Crosses 6 sites eligible for the NRHP and 13 sites of undetermined eligibility.	Crosses 7 sites eligible for the NRHP and 9 sites of undetermined eligibility.	Crosses 3 sites eligible for the NRHP and 20 sites of undetermined eligibility.	Alt 4 would pose a risk to the lowest number of cultural resource sites. Alt 3 would pose a risk to the greatest number of cultural resource sites.
Visuals - General	Potential impact compared to other alternatives is dependent on proximity to viewers and physical contrast	Potential impact compared to other alternatives is dependent on proximity to viewers and physical contrast.	Potential impact compared to other alternatives is dependent on proximity to viewers and physical contrast	Decline in aesthetic quality of a view shed, visual contrast or landscape change due to contrast with natural landscape.
Visuals – Residences within ¼ mile	17 residences	23 residences	22 residences	Alt 2 would be visible from the fewest residences within ¼ mile. Alts 3 and 4 would have similar proximity to residences.
Visuals – Number of Residences ¼ - ½ Mile	60 residences	71 residences	45 residences	Alt 4 would be visible from the fewest residences within ¼ to ½ mile. Alt 3 would be visible to the most residences.
Visuals – Within ½ mile from a Travel Corridor	6.1 miles	7.6 miles	5.0 miles	Alt 4 would be visible from the shortest length of a travel corridor within ½ mile. Alt 3 would have the longest visibility.

Notes:

Alt	Alternative	BPA	Bonneville Power Administration		
EMF	Electric and Magnetic Field	EPA	U.S. Environmental Protection Agency		
Est	estimated	GPS	Global Positioning System	NRHP	National Register of Historic Places
HUD	U.S. Housing and Urban Development	L & C	Lewis and Clark County	TV	Television

3.17.3 Department Findings Necessary for Transmission Line Certification

Under MFSA, DEQ requires a certificate of compliance for development of electric transmission lines. DEQ must find that the selected alternative meets the set of criteria listed under 75-20-301, MCA to be eligible for transmission line certification. Findings for all criteria under each alternative are summarized in **Table 3.17-2**.

TABLE 3.17-2 COMPARISON OF FINDINGS NECESSARY FOR CERTIFICATION BY ALTERNATIVE					
Finding Number	**Finding Criteria**	**Alternative 1 (no action)**	**Alternative 2**	**Alternative 3**	**Alternative 4**
(1)	Within 30 days after issuance of the report pursuant to 75-20-216 for facilities defined in 75-20-104(8)(a) and (8)(b), the department shall approve a facility as proposed or as modified or an alternative to a proposed facility if the department finds and determines:				
(1) (a)	the basis of the need for the facility	Not applicable, the transmission line would not be built.	Additional transfer capacity and transmission access for new wind power generator.	Same as Alternative 2.	Same as Alternative 2.
(1) (b)	the nature of the probable environmental impact	**Table 3.17-1** summarizes probable impacts. Impacts are presented in more detail under specific resource areas in Chapter 3.	**Table 3.17-1** summarizes probable impacts. Impacts are presented in more detail under specific resource areas in Chapter 3.	**Table 3.17.1** summarizes probable impacts. Impacts are presented in more detail under specific resource areas in Chapter 3.	**Table 3.17.1** summarizes probable impacts. Impacts are presented in more detail under specific resource areas in Chapter 3.
(1) (c)	that the facility minimizes adverse environmental impact, considering the state of available technology and the nature and economics of the various alternatives	Not applicable, the transmission line would not be built.	Most potential adverse environmental impacts are minimized through the application of environmental specifications (**Appendix F**).	**Table 3.17.1** summarizes probable impacts. Impacts are presented in more detail under specific resource areas in Chapter 3.	**Table 3.17.1** summarizes probable impacts. Impacts are presented in more detail under specific resource areas in Chapter 3.
(1) (d) (i)	what part, if any, of the line or aqueduct will be located underground	Not applicable	No part of the transmission line would be underground	Same as Alternative 2.	Same as Alternative 2.
(1) (d) (ii)	that the facility is consistent with regional plans for expansion of the appropriate grid of the utility systems serving the state and interconnected utility systems	Not applicable	The transmission line would allow new generators to connect to regional grids and provide a direct connection between Alberta and Montana grid systems.	Same as Alternative 2.	Same as Alternative 2.

TABLE 3.17-2 (Continued) COMPARISON OF FINDINGS NECESSARY FOR CERTIFICATION UNDER 75-20-301, MCA BY ALTERNATIVE					
Finding Number	**Finding Criteria**	**Alternative 1 (no action)**	**Alternative 2**	**Alternative 3**	**Alternative 4**
(1) (d) (iii)	that the facility will serve the interests of utility system economy and reliability	Not applicable	The transmission line would not affect the system economy. Impact to system reliability is unknown. If the system is determined to adversely impact reliability beyond NERC and NWE reliability criteria tolerance levels, the project will not go forward.	Same as Alternative 2.	Same as Alternative 2.
(1) (e)	that the location of the facility as proposed conforms to applicable state and local laws and regulations, except that the department may refuse to apply any local law or regulation if it finds that, as applied to the proposed facility, the law or regulation is unreasonably restrictive in view of the existing technology, of factors of cost or economics, or of the needs of consumers, whether located inside or outside the directly affected government subdivisions	Not applicable	The location of the facility would conform to applicable state and local laws and regulations either as a permitting or licensed condition, or in compliance with project-specific environmental specifications (**Appendix F).**	Same as Alternative 2.	Same as Alternative 2.
(1) (f)	that the facility will serve the public interest, convenience, and necessity	Not applicable	The facility would serve public interest, convenience and necessity as described in **Table 3.17-3**.	Same as Alternative 2.	Same as Alternative 2.

TABLE 3.17-2 (Continued)
COMPARISON OF FINDINGS NECESSARY FOR CERTIFICATION UNDER 75-20-301, MCA BY ALTERNATIVE

Finding Number	Finding Criteria	Alternative 1 (no action)	Alternative 2	Alternative 3	Alternative 4
(1) (g)	that the department or board has issued any necessary air or water quality decision, opinion, order, certification, or permit as required by 75-20-216(3)	No permits would be necessary.	The department would issue all necessary environmental permits and applicable project-specific environmental specifications. MATL has not applied for air or water quality permits.	Same as Alternative 2.	Same as Alternative 2.
(1) (h)	that the use of public lands for location of the facility was evaluated and public lands were selected whenever their use is as economically practicable as the use of private lands	Not applicable	10.1 miles of the line would be located on Montana State and federal land. 120.2 miles would be located on private land.	5.4 miles of the line would be located on Montana State and federal land. 116.2 miles would be located on private land.	11.6 miles of the line would be located on Montana State and federal land. 128.1 miles would be located on private land.
(2)	In determining that the facility will serve the public interest, convenience, and necessity under subsection (1)(f), the department shall Consider the statutory requirements items below and rule-making requirements in **Table 3.17-2**:				
(2) (a)	the items listed in subsections (1)(a) and (1)(b);	See (1)(a) and (1)(b) above	Same as Alternative 1	Same as Alternative 1	Same as Alternative 1
(2) (b)	the benefits to the applicant and the state resulting from the proposed facility	The applicant would not make anticipated profit. The state would not receive tax revenue from workers and future related development.	Benefits to the applicant would be the monetary profit from operating the transmission line. Benefits to the state may be more efficient operation of the grid, local tax revenues to counties in which the line is located, state tax revenues from the line, a short-term boost to local economies from construction, future electricity generation, and possible opening of spot electricity market within which Montana utilities can buy electricity.	Similar to Alternative 2.	Similar to Alternative 2 with the exception that the applicant profit would not be adequate to go forward on the project.

TABLE 3.17-2 (Continued) COMPARISON OF FINDINGS NECESSARY FOR CERTIFICATION UNDER 75-20-301, MCA BY ALTERNATIVE					
Finding Number	**Finding Criteria**	**Alternative 1 (no action)**	**Alternative 2**	**Alternative 3**	**Alternative 4**
(2) (c)	the effects of the economic activity resulting from the proposed facility	Farmers would not experience increased costs from loss of farming acreage or experience difficulty farming due to the poles.	Impacts would be minimal at a state level. Construction benefits would be short term. Line maintenance employment benefits and tax benefits would be long term but likely small at both a county and state level except for Pondera County which could earn up to $1 million per year in tax revenue. Farmers would experience greater costs from loss of farming acreage and difficulty farming due to the poles. Some of these costs would be mitigated by payments from MATL.	Similar to Alternative 2	Similar to Alternative 2 with the exception that cost to farmers from loss of farming acreage and difficulty farming due to the poles would be less due to decreased diagonal crossings on farm fields and increased used of single poles.
(2) (d)	the effects of the proposed facility on the public health, welfare, and safety	Not applicable	The facility would not likely have adverse affects on public health, welfare and safety.	Similar to Alternative 2	Similar to Alternative 2

Notes:
Alt Alternative
MATL Montana Alberta Tie Line